OPERATOR'S AND SYSTEM MANUAL

MODEL 820 KSR TERMINAL

2208225-9701, Rev. J
October 1988

TEXAS INSTRUMENTS

Model 820 KSR Terminal Operator's and System Manual
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CHANGE NOTICES

Revision Letter	Date	ECN		Description
		Number	Level	
A	12-1-80	469123	D	Up to latest engineering data; correct errors
B	9-15-81	479988	D	Update manual per ECN.
C	11-1-83	511903	C	Change FCC Warning.
D	10-28-84	435166	E	Update Manual Per ECN
E	5-20-85	514008	D	Delete Cover P/N From LM.
F	8-30-85	516202	D	Drawing change to -0002 Cover Stock
G	9-9-85	543587	E	Change ribbon P/N
H	10-10-87	01797	D	Drawing Change
J	10-3-88	D04460	E	Delete Appendix E

IMPORTANT

Record on the lines provided below the model number and serial number of your terminal. The serial number is identified by the words "Serial No." on the label located on the back of the terminal. The model number is located on the line above the serial number. This information is to be recorded and retained for future reference.

Model Number _____

Serial Number _____

All units manufactured as of October 1, 1983 meet the emission requirements of FCC Class A as stated below.

WARNING

This equipment generates, uses, and can radiate radio frequency energy and if not used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for Class A computing devices pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

Preface

This manual provides detailed information for installing, operating, and routinely maintaining the Texas Instruments Omni 800* Model 820 Keyboard Send-Receive (KSR) data terminal identified by model code 821. Users of Model 820 KSR with model code 820 should refer to manual 999854-9701. The model code of your terminal is found in the third, fourth and fifth digits of the unit serial number; e.g., 04821-99999.

PART 1. OPERATOR'S MANUAL

Provides information required by all users.

Section 1. **Familiarization with the Model 820 KSR:** This section briefly describes the Model 820 Keyboard Send-Receive (KSR) terminal and its features.

Section 2. **Preparing the Model 820 KSR for Operation:** This section explains the procedures necessary to initially install and prepare the Model 820 KSR Terminal for operation.

Section 3. **Basic Terminal Operations:** This section explains the normal modes of terminal operation.

Section 4. **Changing the Operating Parameters:** This section contains reference information concerning the operating parameters and methods for reviewing, entering, and changing these parameters.

Section 5. **Using the Format Control Capability:** This section describes the use of the FORMAT Control (Standard), and the Device/Forms Control option (Operator Command Set). The option may or may not be present on your Model 820 KSR.

Section 6. **Using the Printer Control, Configuration, Protected Answerback Memory, and Keyboard Options.** This section contains information on these options. They may or may not be installed on your Model 820 KSR.

PART 2. SYSTEM MANUAL

Provides information required by programmers and system analysts.

Section 7. **Communications Interface:** This section provides detailed descriptions of line communication characteristics and information about cables and cable connections.

Section 8. **Model 820 KSR Communications System Operating Characteristics:** This section provides detailed information on the Model 820 KSR communications system operating characteristics.

Section 9. **Line Command and Control Sequences:** This section provides

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detailed information on commands and control sequences for which the terminal has a response.

Section 10. **Preventive Maintenance and Self-Test Procedures:** This section provides general maintenance procedures and tests which may be performed by the operator, and detailed self-tests which may be performed by systems personnel.

Appendixes: Information not directly related to operating the Model 820 KSR, but useful for reference purposes, is provided in Appendixes A through D. See the Table of Contents for specific appendix subject matter.

Index: Alphabetical listing of the major paragraphs of this manual.

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LIST OF ILLUSTRATIONS

Part 1. Operator's Manual

Section 1

Familiarization with the Model 820 KSR

1.1 INTRODUCTION

The information in this section is intended to aid the operator in becoming familiar with the Model 820 KSR. Detailed operating procedures are described fully in subsequent sections. Basic information concerning the names and locations of operator controls, indicators, and reference materials are provided in this section. References to other sections are included where appropriate.

The OMNI 800* Model 820 Keyboard Send-Receive (KSR) Data Terminal illustrated in Figure 1-1 operates similarly to a standard office typewriter with one exception: when appropriate cable connections are made, the Model 820 KSR can communicate (send and receive information) with other data processing equipment.

The Model 820 Keyboard Send-Receive (KSR) Terminal is a microprocessor-based, multi-copy, impact terminal. Fully self-contained, the Model 820 KSR offers both rear and bottom paper feed and can be operated on a desk or a terminal stand. The Model 820 KSR utilizes a 9×7 matrix/-character font for legible print quality and prints up to 150 characters per second. The terminal operating parameters are configurable directly from the typewriter-style keyboard. This allows a high degree of operator control of the terminal.

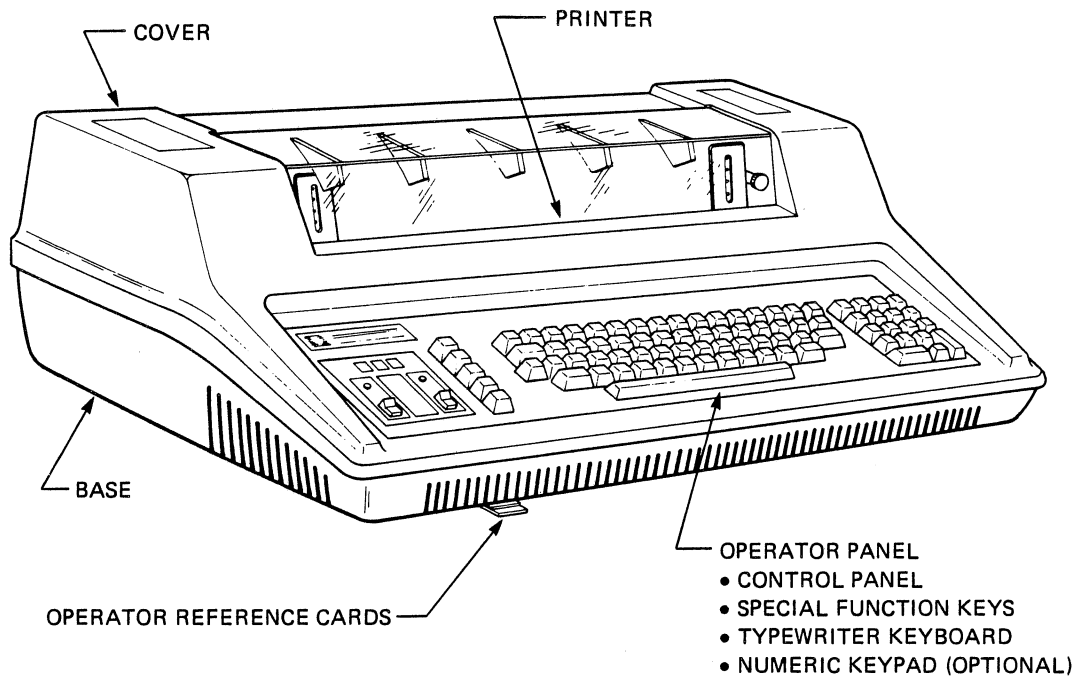


Figure 1-1. Omni 800 Model 820 KSR Data Terminal

The Model 820 KSR is a member of the 820/825 group of Electronic Data Terminal products. Many of its characteristics and features are implemented on the other members of this product group. The familiarization process among the 820/825 KSR group of products is greatly reduced by the fact that operational procedures generally correspond between terminal models within the 820/825 product group.

The Model 820 KSR is composed of the following major components: operator's panel, operator's quick-reference cards, printer mechanism, base and cover assemblies, and rear panel connectors for ac power and communications (line interface) cables.

1.2 OPERATOR'S PANEL

The operator's panel of the Model 820 KSR is divided into three sections: the control panel, the keyboard, and the optional numeric keypad. The operator's panel is illustrated in Figure 1-2. An introduction to each of the controls and indicators is described in this section.

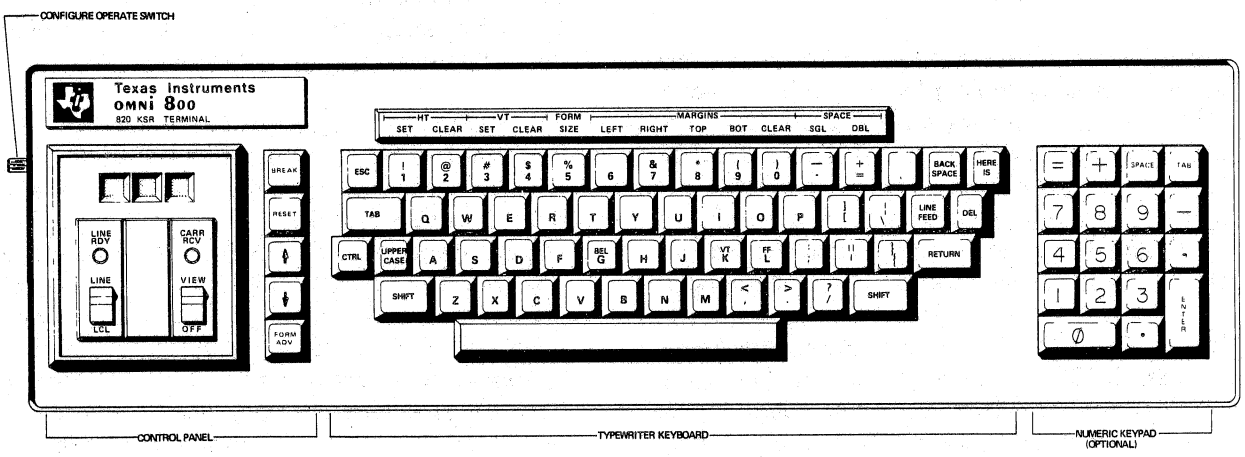


Figure 1-2. Model 820 KSR Operator's Panel

1.2.1 Control Panel

The control panel located on the left of the terminal is shown in Figure 1-3. A brief discussion of the control panel functions follows.

1.2.1.1 LINE/•/LCL Switch. The Line/•/LCL switch is a three-position switch used to select the operating modes of the Model 820 KSR. These operating modes are explained in Section 3.

1.2.1.2 VIEW/OFF Switch. The VIEW/OFF switch provides for enabling or disabling the view feature of the Model 820 KSR which allows the inspection of the last printed character. (Refer to Section 3 for additional information.)

1.2.1.3 LINE RDY and CARR RCV Indicators. These two indicators provide status information when the LINE/•/LCL switch is set to the LINE or • (Standby) position. (Refer to Section 3 for more information.)

1.2.1.4 Terminal Status Display (TSD). This three-digit numeric indicator normally displays the number of the next print column (e.g., if the last character is printed in column 100, the TSD displays 101). The TSD also displays other information such as error status and line number. (Refer to Section 3 for a detailed description.)

1.2.1.5 Special Function Keys. There are five momentary pushbuttons on the control panel: BREAK, RESET, FORM ADV, and two paper alignment keys (↑) (↓). These switches are described in detail in Section 3.

1.2.1.6 Optional Features. If the Model 820 is equipped with an alternate character set (APL) keyboard, a third switch will be installed in the control panel area. This switch selects which character set is printed by the terminal, and its operation is detailed in Section 6. An extra indicator is also added to display the character set selection status.

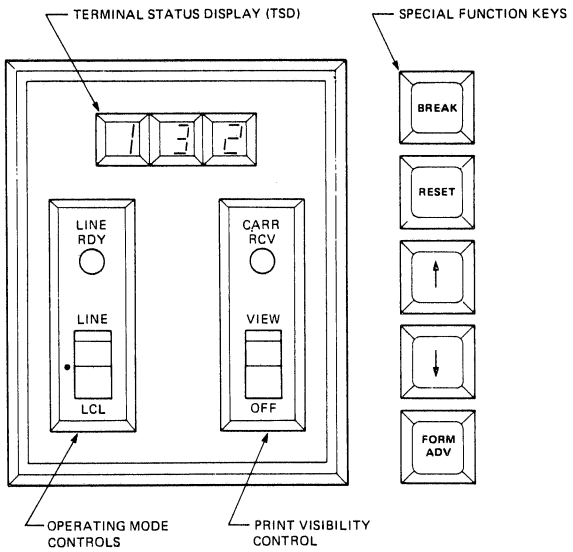


Figure 1-3. Model 820 KSR Control Panel

1.2.2 Keyboard

The typewriter-like keyboard provides the means to enter data for transmission and/or printing. The keyboard of the Model 820 KSR is shown in Figure 1-2. The alphabet, symbol, and punctuation keys are arranged like a standard typewriter. All keys that produce printable characters have typomatic action, which means that a key held pressed for longer than 0.6 second causes that character to be repeated automatically at a rate of 10 characters-per-second until the key is released. A detailed description of the keyboard is given in Section 3.

1.2.3 Numeric Keypad Option

The *numeric keypad option* provides the 18-keys shown in Figure 1-4. The ENTER key, user-programmable from the keyboard, can be set to generate up to a three-character sequence when pressed. (Refer to Sections 4 and 6 for additional information.)

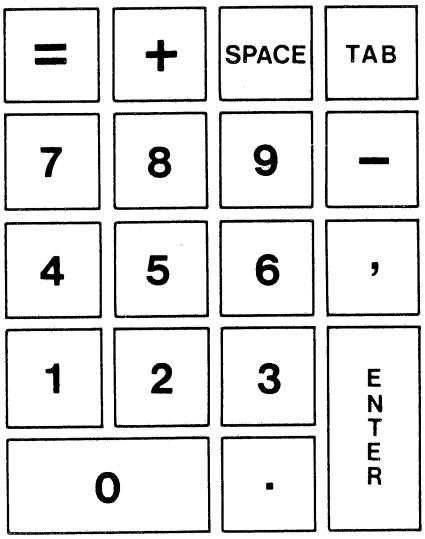


Figure 1-4. Optional Numeric Keypad

1.3 OPERATOR REFERENCE CARDS

A set of Operator Reference Cards is contained in the convenient pull tab tray located at the front left corner of the terminal as shown in Figure 1-1. These pull out cards provide a handy source of information concerning terminal operation. The same information is contained in an expanded format in Appendix D of this manual.

1.4 INTERNAL CONTROLS

The Model 820 KSR has three internal controls; these controls adjust the terminal to accept various widths and thicknesses of paper in the printer, and assist in selecting the operating modes of the terminal. The locations of these internal controls are shown in Figure 1-5. The controls are discussed in the following paragraphs.

1.4.1 Configure/Operate Switch

The CONFIGURE/OPERATE switch is located under the terminal cover to the left of the operator's panel. Terminal operating parameters can be changed when this switch is placed in the CONFIGURE position. (Refer to Sections 3 and 4 for more detailed information on the use of this switch.)

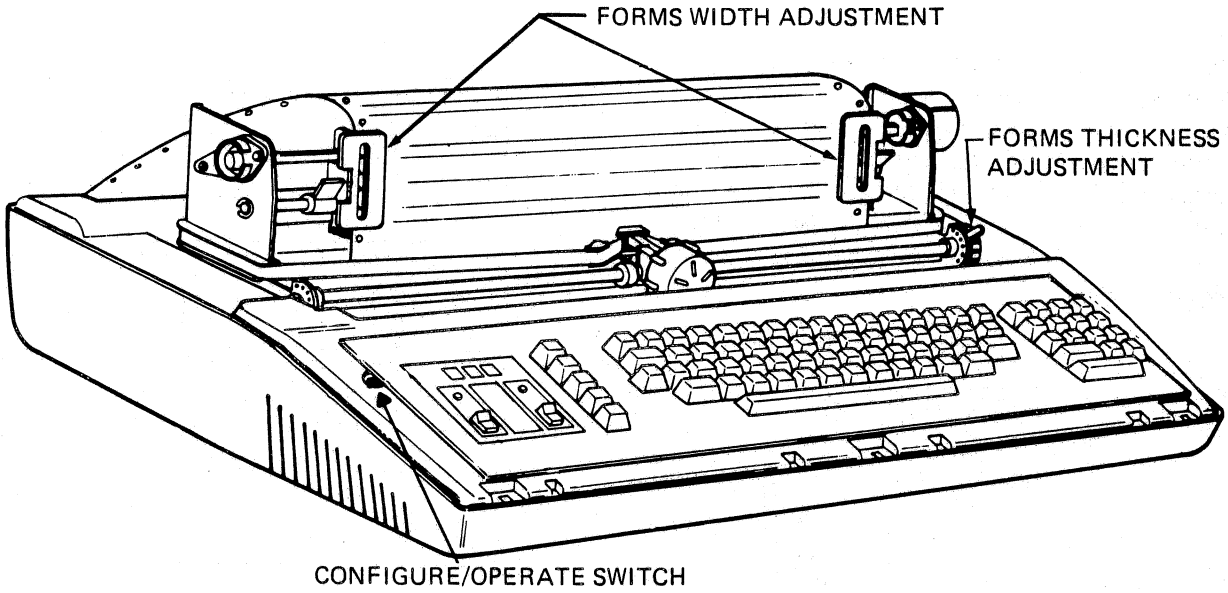


Figure 1-5. Model 820 KSR Internal Control Locations

1.4.2 Forms Width Adjustment

The Model 820 KSR printer mechanism can be adjusted to accept paper widths from 76 mm (3.0 inches) to 378 mm (14.9 inches). Forms width adjustment is accomplished by repositioning either or both of the tractor mechanisms that engage the sprocket holes on the paper. (Refer to Section 2 for directions on how to load and adjust paper.)

1.4.3 Forms Thickness Adjustment

A lever adjustment on the printer mechanism enables the terminal to accept various thicknesses of forms up to one original and five copies. (Refer to Section 2 for use of the adjustment lever.)

1.5 REAR PANEL

On the rear panel of the terminal is the power cord receptacle, the power switch, and the communications interface connection. The rear panel of the Model 820 KSR is illustrated in Figure 1-6.

1.5.1 Power Receptacle

The standard Model 820 KSR is equipped with an IEC standard three-prong power receptacle, mounted on the rear panel of the unit. The terminal is also supplied with a three-conductor 1.8 meter (6-foot) power cord.

1.5.2 Power ON/OFF Switch

The power ON/OFF switch is located on the rear panel of the Model 820 KSR as shown in Figure 1-6.

1.5.3 Communications Interface Connector

The standard Model 820 KSR terminal is equipped with one 25-pin, female communications interface connector mounted on the rear panel. This connector provides the interface connections for communications with an external device. See Section 7 for detailed information concerning the interface specifications and requirements for using this connector. An optional 9-pin connector may be installed here if the Model 820 KSR is equipped with the current-loop option.

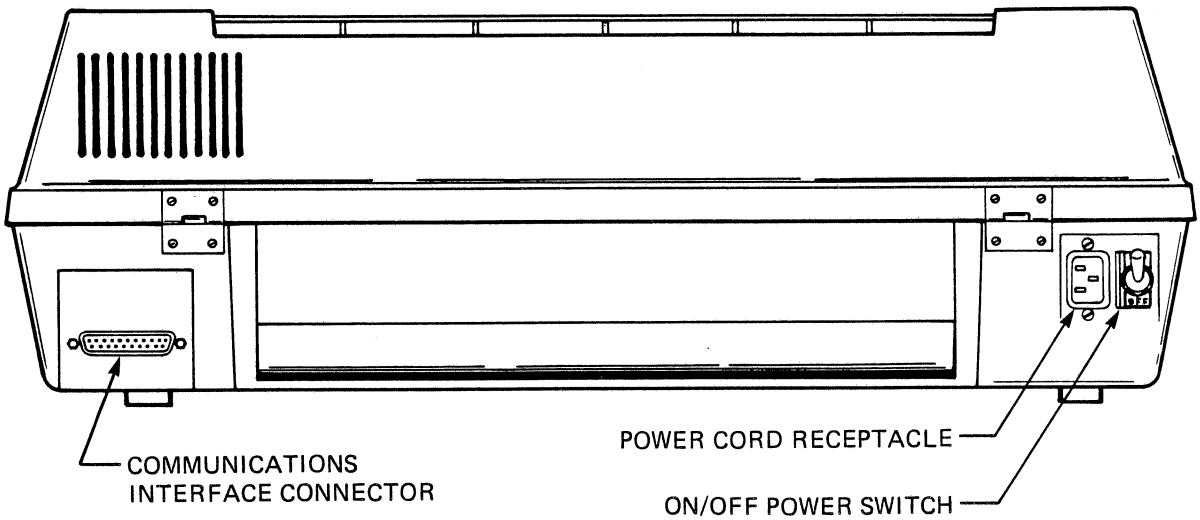


Figure 1-6. Model 820 KSR Rear Panel Component Locations

1.6 DETERMINING THE KSR HARDWARE CONFIGURATION

Underneath the cover and to the left of the paper loading instructions is a label titled PRINTER CONFIGURATION (Figure 1-7).

Either an X or a ✓ placed on the configuration label, as in the illustrated sample, identifies the standard and optional equipment installed on your Model 820 KSR. Table 1-1 defines the configuration label abbreviations.

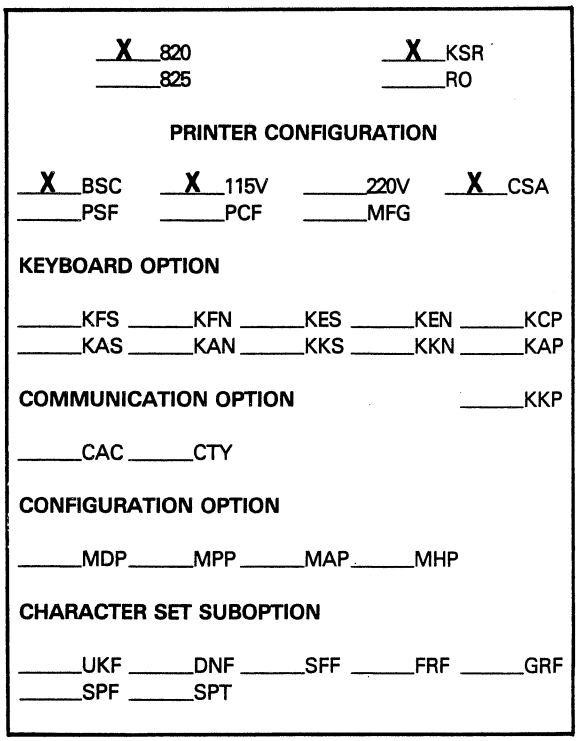


Figure 1-7. Printer Configuration Label

Table 1-1. Model 820 KSR Hardware Configuration Abbreviations

Printer Configuration	
BSC	Basic Model 820 KSR
115 V	115 volt operation
220 V	220 volt operation
CSA	Standard EIA RS-232-C interface
PSF	Standard printer (10 characters per inch)
PCF	Compressed print option (10 and 16.5 characters per inch)
MFG	Device/Forms Control (DFC) option

Communication Options	
CTY	20-mA dc current loop

Configuration Options	
MDP	Default configuration option
MPP	Protected configuration option
MAP	Protected answerback memory option
MHP	Protected answerback memory option, HERE IS key disabled

Character Set Suboptions	
UKF	United Kingdom ASCII
DNF	Danish/Norwegian ASCII
SFF	Swedish/Finnish ASCII
FRF	French ASCII
GRF	German ASCII
SPF	Spanish ASCII[1]
SPT	Spanish ASCII (Text editing)[1]

Keyboard Suboptions	
KFS	Full ASCII Keyboard
KFN	Full ASCII Keyboard with Numeric Keypad
KES	European Keyboard
KEN	European Keyboard with Numeric Keypad
KAS	APL Keyboard
KAN	APL Keyboard with Numeric Keypad
KKS	Katakana Keyboard
KKN	Katakana Keyboard with Numeric Keypad
KCP	RO Control Panel
KAP	APL RO Control Panel
KKP	Katakana RO Control Panel

Note:

1. Not available with ROM sets 03B/04B, 05B/06B, 07B/08B. To determine which ROM set is installed in your terminal, refer to paragraph 10.3.2.4, ROM Identification Report.

Section 2

Preparing the Model 820 KSR for Operation

2.1 GENERAL

This section explains the procedures which prepare the Model 820 KSR terminal for normal operation.

2.2 SPACE REQUIREMENTS

The terminal occupies a flat surface area 66.0 centimeters (26 inches) wide by 60.9 centimeters (24 inches) deep including cable clearance of 7.6 centimeters (3 inches). See Figure 2-1 for terminal outline dimensions. Space (approximately 2 inches on each side of the printer) must be provided for adequate ventilation, and care must be taken that the cooling fan intake and exhaust louvers (on either side of the terminal) are not blocked. An unobstructed paper feed path must be provided behind or below the terminal for the paper supply. A method of holding the printed output must also be provided if the optional paper basket accessory is not used. The terminal should be so located as to allow easy access to the operator controls. The terminal should not be placed in an environment where humidity, temperature, or other specifications listed may be exceeded. A sturdy table capable of adequately supporting 18.6 kilograms (41 pounds) is suitable if the optional floor mounting stand is not used. Regardless of the mounting selected care must be taken to ensure that the paper chute underneath the printer does not bear any weight of the terminal and is not subjected to any pressure which could deform it.

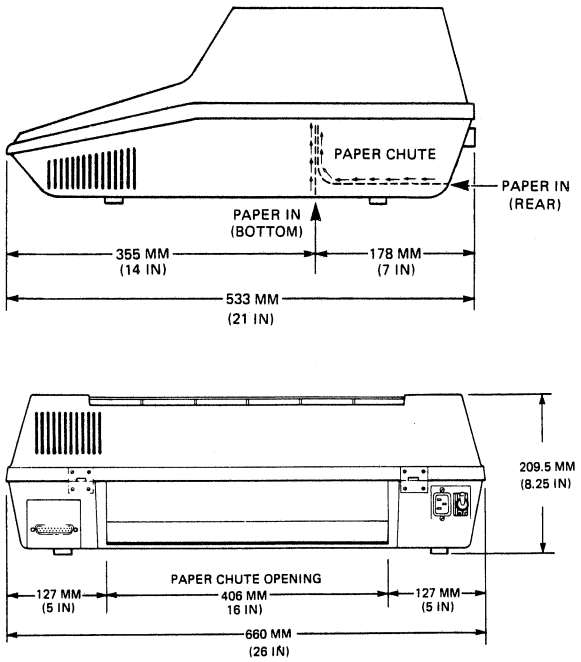


Figure 2-1. Model 820 KSR Terminal Dimensions

2.3 ATTACHING THE POWER CORD

The standard Model 820 KSR Terminal is supplied with a 1.8 meter (6 foot) three-conductor power cord. Install the terminal near a three-prong grounding wall receptacle which supplies the appropriate type power and is capable of accom-

modating the three-conductor plug on the power cord. The hardware configuration label will indicate which type of power (paragraph 1.6) your terminal can use (115 or 220 Vac, 50-60 Hz).

WARNING

Do not attempt to use a receptacle that will not accommodate the three-conductor plug. Do not cut the grounding prong from the plug. An electrical shock hazard may result.

For your personal safety, as well as correct operation, this terminal must be grounded by plugging the power cord into a mating three-prong receptacle, grounded in accordance with the National Electrical Code and local codes and ordinances. Any of the following conditions can pose a possible safety hazard or result in terminal malfunction:

- Open safety ground
- Safety ground connected to neutral or hot
- Safety ground connected to conduit only
- Hot and neutral connections reversed in receptacle (115V systems)

If a properly wired wall receptacle is not available it is the responsibility and obligation of the user to have such a receptacle installed by a qualified electrician.

For satisfactory operation, it is recommended that the terminal not be installed on the same ac branch circuit with copying machines, water coolers or similar appliances which produce power line transients. If terminal malfunctions occur as a result of the operation of such devices, it is the user's responsibility to relocate the terminal to a different branch circuit or to install appropriate transient suppression devices.

When installing the power cord, ensure that the power ON/OFF switch is in the OFF position. Attach the female end of the power cord to the power cord receptacle located on the rear of the terminal. The male plug may then be plugged into the wall receptacle.

2.4 LOADING PAPER

The Model 820 KSR terminal will accommodate continuous form paper with standard sprocket holes on each edge in widths from 76.2 mm to 377.8 mm (3 inches to 14.875 inches). Using either the rear chute or the bottom chute (Figure 2-2), single or multipart forms (one original and up to five copies) can be printed on paper with the following weight specifications:

- Single Part Forms:

  15 pound minimum

- Multiple Part Forms:

Original:	12 pound maximum
Copies:	12 pound maximum
Carbon Paper:	7.5 pound maximum

Card stock up to 0.254 mm (0.010 inch) can be used as either single-part or last-copy-only using the bottom chute. In any case, the total form thickness should not exceed 0.533 mm (0.021 inch).

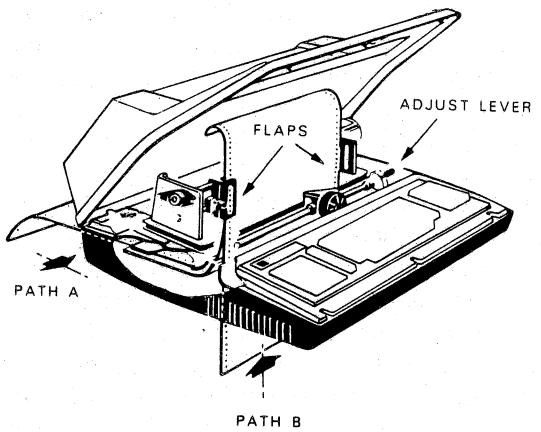


Figure 2-2. Paper Loading Instructions

To lift the terminal cover, position fingers underneath each end of the front of the terminal cover and pull upwards.

NOTE

Considerable effort may be required.

To load paper in the printer, lift the terminal cover and:

1. Open the flaps on both tractors.

2. Move the printhead away from the platen by moving the adjust lever toward the keyboard.

3. Feed the paper into the paper chute at the rear (Path A, printing side down) or up through the bottom (Path B, printing side forward) until the paper appears at the platen (Figure 2-2).

4. Loosen the locking lever on the right tractor and adjust the tractor as necessary to accommodate the paper.

5. Place the paper in both tractors so that the holes in the paper are engaged in corresponding tractor pins.

6. Close the tractor flaps. Adjust the right tractor as necessary to remove the slack in the paper and tighten the locking lever.

7. Check that the paper supply is aligned in the paper chute. (Paper must not rub the sides of the paper chute.)

8. Readjust printhead lever (see paragraph 2.7) and close top.

CAUTION

To prevent possible damage to the printhead do not attempt to print without the paper and ribbon installed.

2.5 INSTALLING THE RIBBON

The Model 820 KSR printer uses a 40-yard long by 12.7 mm (0.5 inch) wide nylon ribbon (TI Part No. 2246601-0001) mounted on two spools.

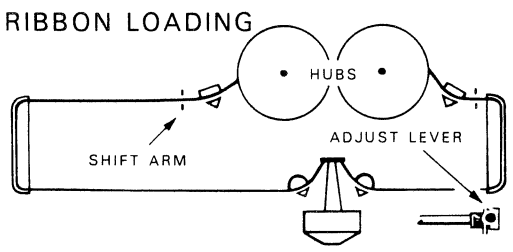


Figure 2-3. Ribbon Installation Instructions

CAUTION

To prevent possible damage to the printhead do not attempt to print without the paper and ribbon installed.

To install ribbon in the printer, lift the terminal cover and:

1. Move the printhead away from the platen by moving the adjust level towards the keyboard.

2. Place a full ribbon spool on the hub with ribbon exiting from far side. Feed the ribbon along the path as shown in Figure 2-3 and install the empty spool, removing any ribbon slack.

3. Check that the empty spool ribbon eyelet is between the shift arm and the spool and that the ribbon is between the vertical guides on each side and printhead.

4. Readjust printhead (see paragraph 2.7) and close cover.

2.6 SWITCHING POWER ON

To switch the power on proceed as follows:

1. Ensure that the LINE/•/LCL switch is set to the LCL position (lower edge depressed).

2. Set the power switch located on the rear panel next to the power cord, to the ON (up) position.

Observe that all control panel indicators illuminate, the terminal status display (TSD) displays an 888 code, and the printhead aligns with the left margin. The normal termination of this sequence is indicated when a short audible tone is generated by the terminal. At this time the TSD will display the column number where the printhead is positioned (the left margin).

If a failure occurs during the switch-on sequence, the terminal will indicate the failure by sounding a

long audible alarm tone and by flashing an error condition code in the TSD. See Section 3 for further explanation of the error conditions.

2.7 ADJUSTING THE PRINTHEAD

The printhead may be adjusted for various forms or paper thicknesses by moving the forms thickness adjustment control lever toward the terminal operator's panel (FRONT of terminal) for thicker (multicopy) paper or toward the tractor mechanism (REAR of terminal) for thinner (single copy) paper as illustrated in Figure 2-4.

To check for satisfactory adjustment of the control lever positioning, print some characters and observe the results:

1. Place the LINE/•/LCL switch in the LCL or • (STANDBY) position.

2. Depress one of the alphabetic or numeric keys on the keyboard.

   a. If the characters are not fully formed or appear too light, move the lever toward the rear of the terminal.

   b. If the characters are extremely dark or ribbon smudging occurs, move the lever toward the front of the terminal.

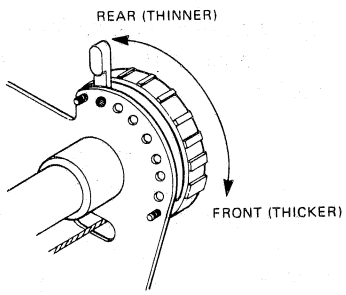


Figure 2-4. Forms Thickness Adjustment Control

2.8 INITIATING A PRINT TEST

After the initial preparation for the operation of the Model 820 KSR (paragraphs 2.3 through 2.7) have been completed, you may wish to run a print (barberpole) test. The procedure is as follows:

1. Place the LINE/•/LCL switch to LCL (lower edge depressed)

2. Simultaneously depress:

   [CTRL] [SHIFT] [1]

   The terminal will respond by printing characters on the paper at the maximum print speed.

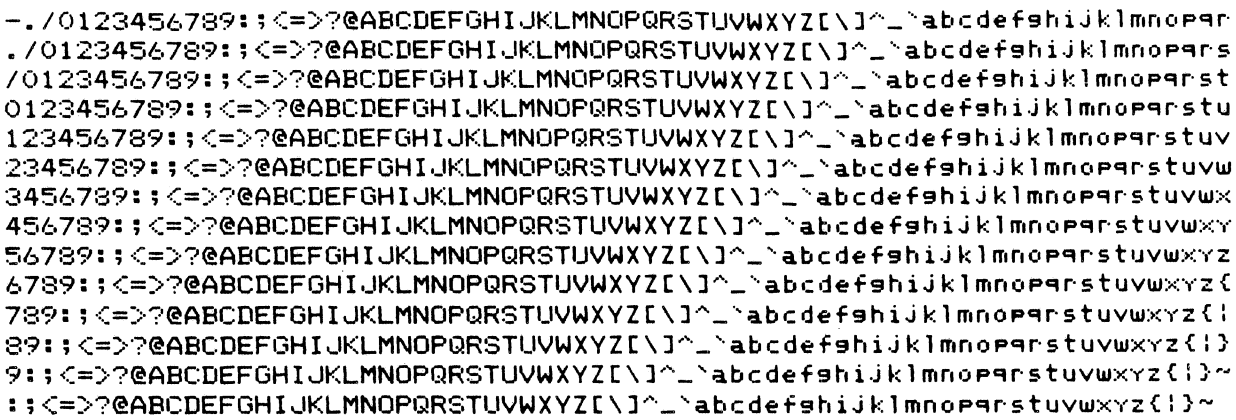
NOTE

This print test will print within the defined margins which will be at the maximum values (full width of the carriage) when the Model 820 is delivered. If your paper is less than 14 inches wide, you should set the right margin (see Section 5) prior to running this test.

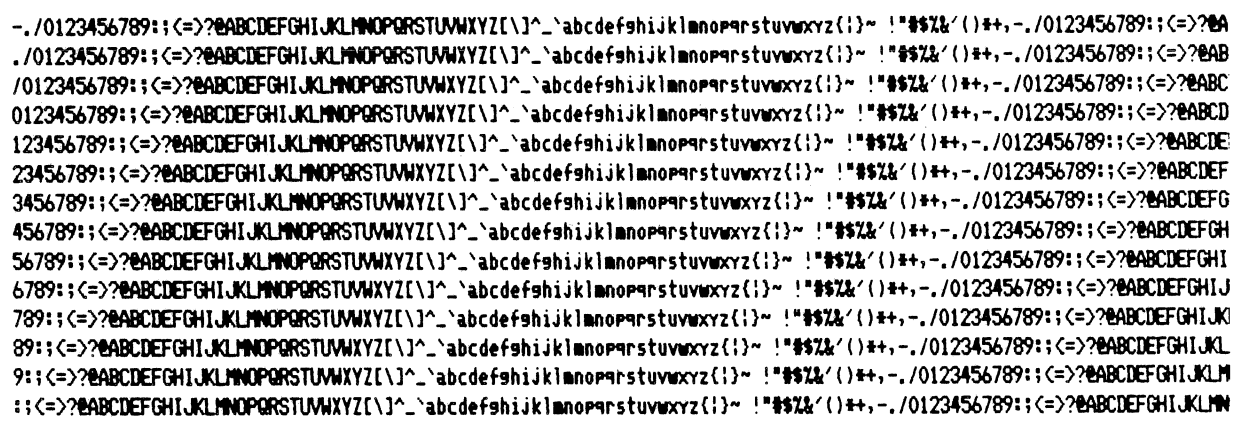
3. To terminate the test depress:

   [RESET]

A detailed description of this test is contained in Section 10. Figure 2-5 contains a sample of a barberpole test pattern.



A. STANDARD PRINTING TEST



B. COMPRESSED PRINTING TEST

Figure 2-5. Sample Barberpole Test Results

Section 3

Basic Terminal Operations

3.1 INTRODUCTION

This section explains the normal modes of operation and the manual operational characteristics of the Model 820 KSR terminal.

3.2 OPERATING MODES

The Model 820 KSR provides three normal modes of operation, selectable from the operator control panel:

Local (LCL)

Standby (•)

Line (LINE)

and one special operating mode, the CONFIGURE mode. These four modes are controlled by two switches: the LINE/•/LCL and CONFIGURE/OPERATE switches.

3.2.1 CONFIGURE Mode

To reduce the number of switches and knobs the operator must use, the operating parameters of the Model 820 KSR are controlled by an internal computer (microprocessor). The special CONFIGURE mode enables the operator to communicate directly with the internal computer to set up or change the operating parameters. All commands are simple sequences entered via the terminal keyboard. When the terminal operating parameters must be changed (reconfigured), the operator need only switch the LINE/•/LCL switch to LCL and the CONFIGURE/OPERATE switch to CONFIGURE to enter the configure mode and enable command entries via the keyboard. When the command entries are completed and the CONFIGURE/OPERATE switch is returned to the OPERATE position, any one of the three normal operating modes (Local, Standby, or Online) is available to the operator. The use of the CONFIGURE mode is described in detail in Section 4.

3.2.2 Local (LCL) Mode

When the LINE/•/LCL switch is placed in the LCL position, the terminal has characteristics similar to a typewriter. It can not communicate with any other equipment.

3.2.3 LINE Mode

The LINE position of the LINE/•/LCL switch places the Model 820 KSR ONLINE. This means that the terminal may communicate with the equipment that is connected to it.

3.2.4 Standby (•) Mode

Standby is the middle position of the LINE/•/LCL switch, indicated by the • on the side of the switch. If your system permits, this mode enables you to put a temporary "hold" on a call that is in progress without disconnecting the call.

NOTE

Certain combinations of the CONFIGURE/OPERATE and LINE/•/LCL switch positions are defined to be invalid. If one of these invalid combinations is accidentally entered, the Model 820 KSR will immediately begin a rapidly repeating audible alarm signal. Operations will remain suspended and the alarm will continue until a valid combination of the switch positions is entered.

Table 3-1. Switch Conflicts

Valid switch combinations are	
LINE/•/LCL Switch	**CONFIGURE/OPERATE** Switch
LCL	CONFIGURE
LCL	OPERATE
• (Standby)	OPERATE
LINE	OPERATE
Invalid switch combinations are	
LINE/•/LCL Switch	**CONFIGURE/OPERATE** Switch
• (Standby)	CONFIGURE
LINE	CONFIGURE

3.3 KEYBOARD

The keyboard provides the means to enter data for transmission and/or printing. The keyboard of the Model 820 KSR is shown in Figure 1-4. The alphabet, symbol, and punctuation keys are arranged like a standard typewriter. Printable characters generated from the keyboard while the terminal is in the Local or Standby (•) operating mode will be printed by the terminal; valid control characters will cause the printer to perform the appropriate action (e.g., line feed). Characters generated from the keyboard while the terminal is in the LINE operating mode and connected to an active communications link, will be transmitted on the communications link. Characters generated in the LINE mode will not cause any action by the terminal's printer unless the local copy operating parameter has been enabled.

All keys that produce printable characters have typomatic action, which means that a key held pressed for longer than 0.6 second causes that character to be repeated automatically at a 10 characters-per-second rate until the key is released.

3.3.1 Shift and Upper Case Keys

The SHIFT key(s) are used for the same purpose on the Model 820 KSR as on a standard office typewriter. If one of the alphabet keys (A through Z) is pressed while holding a SHIFT key pressed, the keyboard will generate uppercase characters (i.e., capital letters). Without holding the SHIFT key depressed the terminal will generate lowercase letters. If one of the nonalphabetic "two-function" keys (such as the !/1 or the +/= keys which have two labels on them) is pressed while holding a SHIFT key pressed, the character or function appearing on the upper half of the key will be generated. Without holding the SHIFT key pressed (i.e., unshifted) the terminal will generate the character or function identified on the lower half of the key.

The UPPER CASE key is a special alternate action locking key. If this key is locked in the down position, the keyboard will generate only uppercase (capital) letters. The keyboard cannot generate lowercase alphabet letters when the UPPER CASE key is locked in the down position. Only the alphabet letters **A** through **Z** are affected by the UPPER CASE key.

3.3.2 CTRL Key

Although use of the CTRL (control) key is generally restricted to communication operations, it is

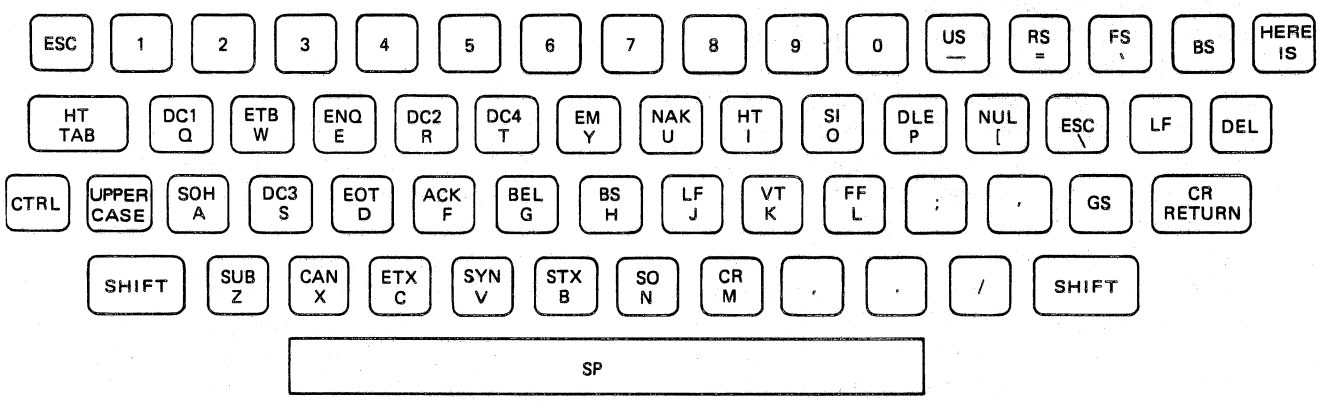


Figure 3-1. Control Character Layout

also used in some of the self-test features of the Model 820 KSR. By pressing and holding the CTRL key in the down position the keys of the keyboard will generate special control character codes. The keyboard layout with the CTRL key depressed is shown in Figure 3-1. (See Section 9 for a detailed explanation of the Model 820 KSR usage of the control codes.)

3.3.3 Special Control Keys

The ESC, TAB, BACKSPACE, HERE IS, LINE FEED, DEL, and RETURN keys are special control keys whose operation depends upon the operating mode of the Model 820 KSR as controlled by the LINE/•/LCL switch.

When the Model 820 KSR is in local (LCL) or standby (•) mode, the keyboard is connected directly to the printer and all typed characters will be printed. In these modes the RETURN, BACKSPACE, and LINE FEED keys function as their names imply. When the RETURN key is pressed, the printhead returns to the left margin. The BACKSPACE key moves the printhead to the left one character space. When the LINE FEED key is pressed, the printer advances the paper one line space.

The ESC key is used to initiate special control sequences which can be used to modify the format of the printed data. If the device/forms control (DFC) option is installed in your terminal, the TAB key will cause the printhead to advance at high speed to the next column where a tab stop has been set. (See Section 5 for an explanation of the format control capability of the Model 820 KSR.)

When the Model 820 KSR is in the LINE mode, the HERE IS key initiates the transmission of a predefined answerback memory message. (See Sections 4 and 8 for further details of the answerback memory operation.)

When the Model 820 KSR is in the special *CONFIGURE Mode* the TAB, DEL, and RETURN keys are used as special command keys. (See Section 4 for an explanation of *CONFIGURE mode* operation.)

3.4 VIEW/OFF SWITCH

When this two-position switch is in the VIEW position and no printable or control characters have been printed for more than 1 second, the printhead will move to the right to permit the last character printed to be viewed by the operator. When the printhead is positioned to the right, a small pointer affixed to the left side of the printhead indicates the position where the next printable character will be printed. The printhead always returns to its previous position when a new character is received for printing. When the VIEW/OFF switch is in the OFF position, the printhead will not move to the right and the last printed character will remain obscured by the printhead.

3.5 SPECIAL FUNCTION KEYS

These five momentary pushbuttons, located in the terminal's control panel are active in the Line mode and with the exception of the BREAK key are also active in the Standby (•) and Local modes. Their functions are described in the following five paragraphs.

3.5.1 BREAK

The BREAK key is used to generate a timed break signal for use in communications protocols. The depression of the BREAK key will cause the longer of: 1) a 256 millisecond break signal or 2) a break signal to be maintained as long as the key is depressed. Use of the BREAK key is explained more fully in Section 8 of this document.

3.5.2 RESET

Pressing the RESET key returns the terminal to normal operation after an abnormal status condition has been corrected. An abnormal status condition is indicated by a status code displayed in the TSB. The RESET key will also cause the printer to print data one line at a time, after a paper out condition is sensed.

3.5.3 (↑)

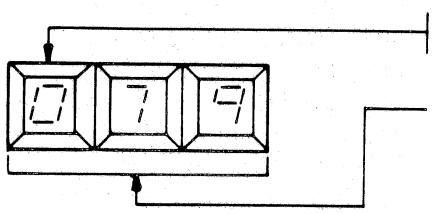
Depression of the (↑) key (Momentary Pushbutton) causes the printer to advance the paper continuously in 1/48 inch increments until the key is released. The operation commences at a rate of 4 increments (1/48 inch) every second and after 8 steps increases to a rate of approximately 16 steps (1/48 inch) every second until the key is released.

3.5.4 (↓)

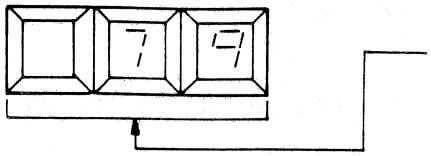
Pressing the (↓) key (Momentary Pushbutton)

Table 3-2. Interpreting Terminal Status Display (TSD) Functions

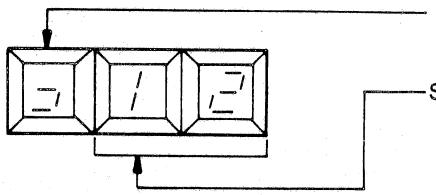
a. Print Column/Current Line Indicator



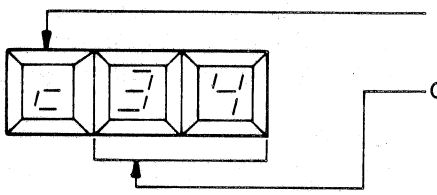
or



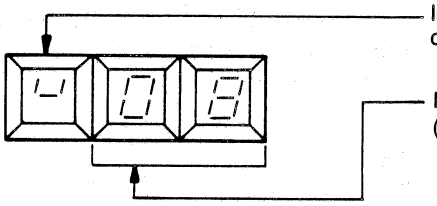
b. Status (Display Flashing)



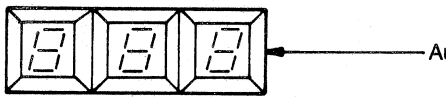
c. Configure Mode



d. Program Answerback Memory (ABM), ENTER key (numeric keypad required), or LTA Characters



e. Indicator Test



causes the printer to move the paper down at a constant rate of 4 increments (1/48 inch) every second until the key is released.

3.5.5 FORM ADV

The FORM ADVance key has two functions in the Model 820 KSR. A momentary depression (less than ¼ second duration) causes the printer to advance the paper by one line. A sustained depression (¼ second or more) causes the printer to advance the paper to the position defined as the top left margin of the next form. The first operation is identified as LOCAL LINE FEED or LINE ADVANCE; the second function is identified as FORM FEED or FORM ADVANCE.

3.6 INTERPRETING STATUS INFORMATION

The Model 820 KSR provides operating information and status indications on the terminal status display (TSD) and other indicators on the operator control panel as well as by audible tone.

3.6.1 Understanding the Terminal Status Display (TSD)

The terminal status display (three-digit indicator) located on the control panel performs several functions. Its normal use is to display the column number of the next print position. (With the DFC option installed, it can also give the current line number. See Section 5 for details.) Other functions of the TSD include displaying error codes or

Table 3-3. Status Codes

TYPE	CODE	DEFINITION	ACTION REQUIRED
I		Power up Fault	
	00	RAM memory fault	Equipment problem: cycle power.
	01	ROM memory I fault	If condition repeats, call for
	02	ROM memory II fault	service; error indication may be
	03	Non volatile memory fault	cleared by depressing RESET.
II		Operator Correctable	
	10	Leaving Configure mode with half duplex set, but no LTA specified	Program LTA character, enable operation without LTA characters, or enable full duplex
	11	Carriage Jam	Clear Jam and depress RESET
	12	Paper Out	Load paper and depress RESET
III		Abnormal Communications	
	21	Loss-of-carrier time out	Depress RESET (Note 2)
	22	Wrong number time out	Depress RESET (Note 2)
	23	Receive buffer overflow	Depress RESET (Note 3)
	24	Parity Error	Depress RESET or change parity (Note 3)
	25	Transmit Buffer overflow	Depress RESET (Note 3)
	26	No activity time out	Depress RESET (Note 2)
	29	Invalid ESC sequence from Communications line	(Note 4)
IV		Special Operating Mode	
	30	Keyboard locked	Depress RESET or local mode
	31	Printer off	Depress RESET or local mode
	39	Test in progress	Depress RESET to terminate test
V		Operator Error	
	]]	Invalid ESC sequence from keyboard due to improper syntax or configuration conflict	Depress RESET and type valid command sequence

NOTES: 1. Clearing of the error indication by depressing RESET may allow operation of the terminal, but proper operation is not guaranteed.
2. Automatically reset when data set ready turns on. (Repetition could indicate data set failure.)
3. Automatically reset when status report transmitted.
4. This code is not displayed, but is transmitted as part of the status report. Automatically resets when status report is transmitted.

abnormal condition codes and Configure mode information, as well as indicating when the power-up test is in progress. It is always possible to tell what type of information is displayed in the TSD because the leftmost character is unique for each type of information. Table 3-2 is a quick reference for interpretation of the TSD functions.

3.6.1.1 Viewing Print Column or Line Count. In normal operation the TSD displays the number of the next column to be printed by the printer. The numbers may range from 001 through 218. When the Device/Forms Control option is installed, it is possible to convert the column indicator to a line indicator by use of escape command sequences. Under this condition the TSD indicates the number of the line currently being printed. The line numbers may range from 01 through 99; 100 through 112. Three-digit numbers less than 100 (001-09) always indicate the next print position. Two-digit numbers less than 100 (01-99) always indicate the current line number. The numbers 100-112 may indicate either a line or column number.

3.6.1.2 Interpreting Status Messages. When the TSD is flashing, an abnormal condition exists in the terminal. The specific condition is indicated by the displayed code. The codes are prioritized in an ascending numeric sequence (i.e., 00 has the highest priority, 39 the lowest). When multiple conditions exist, the one with highest priority is displayed. The next higher priority code will be displayed as soon as the highest priority condition is cleared and so on until all conditions are displayed and cleared. The display is cleared by pressing the RESET key on the control panel. The status codes are listed in Table 3-3 and on the Operator Reference Cards.

3.6.1.3 Identifying CONFIGURE Operations. The TSD provides code information when the Model 820 KSR is in the CONFIGURE mode. CONFIGURE mode is identified by either a ⌐ or a ⌐ in the leftmost window. The ⌐ signifies that the TSD is displaying one of the enabled configuration codes. The ⌐ indicates that programming of the answerback memory, LTA characters, or ENTER key sequence is in progress with the accompanying displayed digits representing the next character position to be programmed. CONFIGURE mode operations are detailed in Section 4.

3.6.1.4 Identifying the Power-Up Test. The TSD will display 888 for the duration of the

Table 3-4. Interpreting the Audible Signal

SIGNAL	EXPLANATION
Short Tone (1/12 sec)	1. ASCII BEL character has been received. OR 2. A configuration command or locally entered ESC command has been accepted. OR 3. Power-up test has been completed successfully. OR 4. The printhead has neared the end of the formatted line, similar to a typewriter bell (only on keyboard-entered data).
Repeated Short Tones	Attempt to place terminal in STANDBY or LINE while in the CONFIGURE mode of operation.
Long Tone (1 sec)	A new status code has been activated or an invalid entry from the keyboard.

automatic test that occurs when power is switched on. Other control panel indicators also will illuminate during the power-up test, providing a visual check of all indicators.

3.7 INTERPRETING THE AUDIBLE TONE

The Model 820 KSR produces an audible tone to provide information concerning the completion of certain terminal activities. Three different types of tones are sounded:

1. A short tone (1/12 second) signifies completion of a normal operation.

2. A rapidly repeating short tone indicates that an attempt to enter the CONFIGURE mode has been made while the Model 820 KSR is in LINE or • (Standby) mode.

3. A long tone (1 second) signifies that a status code has been activated.

Table 3-4 explains the conditions that cause the audible tone.

3.8 PRINTED ERROR SYMBOL

If the Model 820 KSR is configured to print a symbol when parity error is detected, every invalid character received will be replaced by the symbol ◆.

3.9 INITIATING DIAGNOSTIC TESTS OR REPORTS

The Model 820 KSR is equipped with several diagnostic tests and reports to aid in the use and troubleshooting of the terminal. These tests are:

- Test #1 Barberpole Test (Local Mode)
  This test prints a character pattern within the defined margins and exercises the terminals communications logic.

- Test #2 Communications Test (Line Mode)
  This test is primarily intended for setting the transmit level in data sets equipped with that option. It generates a continuous stream of characters at the configured baud rate which are sent to the data set through the EIA interface.

- Test #3 Configuration Report (Local or Standby Mode)
  This is a printed report containing the enabled configuration codes and configured LTA characters, and may contain the answerback memory.

- Test #4 ROM Report (Local Mode)
  This is a printed report of the revision numbers of the ROM set contained in the terminal.

- Test #5 Format Report (Local or Standby Mode)
  This is a printed report of the form length, characters per inch spacing, lines per inch spacing, and the margin settings.

- Test #6 Run-In Test (Local Mode)
  This test causes the communications logic and printer mechanism to be exercised.

Detailed descriptions of these diagnostic tests/reports are contained in Section 10.

The procedure for initiating a test is as follows:

1. Place the LINE/•/LCL switch to a position permitted for the test/report desired (LCL or Standby for most tests, LINE for Test #2).

2. Momentarily depress the key (1-6) corresponding to the number of the desired test, while simultaneously holding down the CTRL and SHIFT keys.

3. The test/report will begin.

NOTE

If test number 2 is selected, the character you desire to be transmitted must also be entered before the test will be initiated. Any printable or control character is acceptable.

4. To terminate a test depress: [RESET] (located on the control panel).

NOTE

Reports will automatically terminate.

3.10 SETTING FORM LENGTH AND TOP OF FORM

The form length and top of form are set by using the special function keys [FORM ADV], [↑], and [↓], and the command sequences [ESC] [5] [*N*] [;] entered from the keyboard, where *N* = the number of lines desired in the form. The following paragraphs illustrate this procedure. For further information see paragraph 5.8.1.

3.10.1 Setting Form Length; Paper Length Known

(Maximum length is 14 inches.)

1. Set terminal to LCL or • (Standby).
2. Simultaneously depress [CTRL] [SHIFT] [5]. Terminal responds with digits printed in the following format:

   AAA;BBB;CCC;DDD;EEE;F;GG
3. Determine if in 6 lines/inch or 8 lines/inch from report.
   1. If F = 3 or 6 then at 6 LPI.
   2. If F = 4 or 8 then at 8 LPI.
4. Align paper using [FORM ADV], [LINE FEED], and [↑] [↓]. Paper alignment can be checked by printing some characters as shown in Figure 5-3.
5. Determine the number of lines in the form from Table 3-5 or multiply the length in inches by the basic pitch (6 or 8) determined in 3.
6. Enter [ESC] [5] [*N*] [*N*] [*N*] [;], where *NNN* is the number of lines from step 5 (leading zeros not required). The terminal will acknowledge the command with short bell tone. For example, if the form length is 11 inches, and F (from step 5) equal to 3 or 6, the following sequence would be entered:

   [ESC] [5] [6] [6] [;]

   This would set a form length of 66 lines.

NOTE

If auto perforation is set the terminal will move to line 3 of the form.

Table 3-5. Number of Lines Set for Standard Forms

Value of F	Form Length In Inches										
	3.0	3.5	4.0	5.5	6.0	7.0	8.0	8.5	11	12	14
3 or 6	18	21	24	33	36	42	48	51	66	72	84
4 or 8	24	28	32	36	48	56	64	68	88	96	112

NOTE

The procedure for setting the form length when the paper length is not known is in paragraph 5.8.2.

3.10.2 Setting the Top of Form

When the form length is correct and only the top of form needs to be set, the following procedure may be used.

1. Ensure that the LINE/•/LCL switch is set to Standby (•) or LCL.
2. Align the printhead to the first line under the perforation with [FORM ADV], [↑], [↓], [LINE FEED]. This can be verified by printing a character.

3. Enter
   [ESC] [5] [;]
   The terminal will sound short bell tone and move to the top margin if the top margin is not line 01.

3.11 USING THE STANDBY POSITION

When the Model 820 KSR is in the LINE mode and communicating with a remote device, a condition such as paper-out or a carriage jam might occur. If configured to do so, the Model 820 KSR will automatically signal a BUSY condition to the remote device when either of the above conditions occur. However, the operator is faced with the immediate responsibility of either clearing the problem and continuing without terminating the connection, or of terminating the connection:

1. To terminate the connection set the LINE/•/LCL switch to LCL.

2. To maintain the connection, set the LINE/•/LCL switch to • (Standby).

While the Model 820 is in Standby mode, the LINE RDY indicator flashes on and off. In this mode of operation, the Model 820 KSR inhibits all reception of data, but maintains control signals to sustain the connection (all controls and keys are active). This enables solving the problem condition without fear of responding to received information from the remote equipment while working on the terminal.

CAUTION

This position may cause a loss of data if your system does not respond to the Model 820 KSR busy signal sent for paper out or carriage jam.

3.11.1 Replacing Paper (Local or Standby)

One operational note must be emphasized concerning replacement of paper after a paper-out condition is identified in LINE mode. As soon as the Model 820 KSR recognizes paper-out, it stops printing and signifies BUSY (if possible) to the external equipment. It is possible that one or two lines of data will remain to be printed on the current page (form). Assuming that the data to be printed is already in the Model 820 KSR receive buffer, to complete printing the current form, proceed as follows:

1. Switch the LINE/•/LCL switch to LCL or • (Standby).

2. Press the [RESET] key once for each line of data remaining to be printed on the form. If nothing prints, the Model 820 KSR has printed all data it has received.

3. Load the paper (see instruction on label inside of terminal).

4. Reset the top of form (see paragraph 3.10.2).

5. Set the LINE/•/LCL switch to LINE.

6. Press the [RESET] key and resume operation.

3.11.2 Replacing the Ribbon (Local or Standby)

If the printing becomes too light and adjustment of the platen is correct then the ribbon needs to be replaced.

1. Set LINE/•/LCL switch to • (Standby) or Local position.

2. Replace ribbon; follow instructions on the label affixed inside terminal.

3. Return LINE/•/LCL switch to LINE position.

CAUTION

Placing the terminal in Standby mode will not cause a busy signal to be sent by the Model 820 KSR if it is in full-duplex or half-duplex data set communications mode. If data is received while in the Standby mode it will be lost.

3.12 PLACING THE TERMINAL ONLINE

The Model 820 KSR must be set to the LINE mode

so that it can communicate with external equipment. The Model 820 KSR may be placed in LINE mode by setting the LINE/•/LCL switch to the LINE position. If the Model 820 KSR is connected to the external equipment using a communications interface cable, it is now possible to establish data transfer between the Model 820 KSR and the external equipment.

3.13 INTERPRETING CONTROL PANEL INDICATORS

The operator control panel on the standard Model 820 KSR has two communications indicators: CARR RCV (carrier received) and LINE RDY (line ready). These indicators enable the operator to monitor the communications status of the terminal. They have meaning only when the Model 820 KSR is in the LINE or • (Standby) operating mode and the terminal is physically connected by a cable to an external device.

A third indicator is added on terminals equipped with the Alternate Character Set keyboard. It indicates which character set is selected at any one time for transmission and printing. This optional indicator is described in Section 6.

3.13.1 CARR RCV

The CARR RCV (carrier received) indicator illuminates when the data set (or other interface device) provides a Data Carrier Detect (DCD) signal to the Model 820 KSR terminal. The CARR RCV indicator does not indicate that the terminal is receiving data, only that the conditions necessary for receiving data are satisfied.

3.13.2 LINE RDY

The LINE RDY (line ready) indicator has three states: on, flashing, and off. The meaning of the indicator when it is on or flashing varies with the communications mode of the terminal. In general, the lighted LINE RDY indicator signifies that the communications requirements for the selected mode of operation are satisfied. When the LINE RDY indicator begins to flash, it is an indication that the terminal is in Standby or that one of the control signals necessary for communication with a remote device is not present. When the LINE RDY indicator is off, it indicates that the communications line is not ready for use.

Table 3-6 lists the functions of the CARR RCV and LINE RDY indicators in relationship to the communications modes.

Table 3-6. Standard Indicators

COMMUNICATION MODE	CARR RCV Indicator		LINE RDY Indicator		
	ON	OFF	FLASHING	ON	OFF
Half Duplex	Ready to Receive	Receive not ready; transmit available	In standby or transmit requested but not ready	Comm line ready	Comm line not ready
Full Duplex		Receive not ready; no carrier	In standby or transmit not ready		

Section 4

Changing the Operating Parameters

4.1 INTRODUCTION

The CONFIGURE mode is a special operating mode in which the operating parameters of the Model 820 KSR can be changed. The selection of this mode is controlled by the position of the LINE/•/LCL switch on the operator panel and the CONFIGURE/OPERATE switch located beneath the terminal cover. All parameter changes are accomplished by entering two-digit command sequences from the keyboard. The terminal status display (TSD) on the operator panel provides the configuration information to the operator while the Model 820 KSR is in the CONFIGURE mode. The Operator's Reference Cards provide reference information.

Configuration (operating) parameters are usually entered at the time of installation and are seldom if ever changed. As soon as a parameter is entered via the keyboard, it is stored in a memory (non-volatile memory) that does not "forget" when the power is switched off. Therefore, once the configuration parameters are entered, they are retained even when the power is off. When the power is switched on, the Model 820 KSR is ready for operation and no changes are required. To ensure that operating parameters remain unchanged while the power is off, the Model 820 KSR automatically checks the contents of its non-volatile memory every time power is switched on. If an error is detected, a test fault is reported and the Model 820 KSR automatically loads a set of default parameters that are stored in a permanent memory. The default parameter set is described in more detail later in this section.

The following paragraphs contain reference information concerning available parameters; methods for reviewing, entering, and changing parameters; and instructions for entering and terminating the CONFIGURE mode.

4.2 CONFIGURATION CODES AND PARAMETERS

Each configuration parameter available in the Model 820 KSR is identified by a unique two-digit code. The codes themselves are categorized by the type parameter they identify. Individual parameters and their identifying codes are shown in Table 4-1.

See Appendix B for an explanation of each parameter.

4.3 LISTING THE CURRENT CONFIGURATION PARAMETERS

When the Model 820 KSR is not in the CONFIGURE mode, a printed report listing all current operating parameters that are enabled can be obtained by the following method:

1. Set the terminal to either local or standby using the LINE/•/LCL switch located on the control panel.

2. Depress simultaneously the [CTRL] [SHIFT] and [3] keys. The terminal will respond by printing:

   NN;NN;NN;....;T
   AAA....A

   where NN is the 2-digit code corresponding to the enabled configuration parameter, T is the line turnaround

Table 4-1. Configuration Code Selections

Code	Meaning
	Predefined Configuration Selection (One Only)
01-08	Select corresponding predefined configuration set (option required)
09	Select standard default configuration set
	Communication Mode Selection (One Only)
11(1)	Half duplex
12(1)	Half duplex with reverse channel
13(2)	Full duplex (For type 103, 113, and 212 data sets)
14	Full-duplex reverse channel ON for ready (console mode)
15	Full-duplex reverse channel OFF for ready (console mode)
16	DC Current Loop (option required)
	Transmission Rate Selection (One Only)
21	110 baud
22	200 baud
23	300 baud
24	600 baud
25	1200 baud
26	2400 baud
27	4800 baud
28	9600 baud
29(2)	300/1200 baud (For 212 data sets with autoselect option)
	Parity Selection (One Only)
31	Transmit odd parity, receive parity checkoff
32(2)	Transmit even parity, receive parity checkoff
33	Transmit odd parity, indication on receive error
34	Transmit even parity, indication on receive error
35	Transmit odd parity, indication plus printed symbol on receive error
36	Transmit even parity, indication plus printed symbol on receive error
37	Transmit mark parity, receive parity checkoff
38	Transmit space parity, receive parity checkoff

Notes:

1. Half-duplex operation: Configuration codes 11 and 12 should be selected only when operating with true half-duplex data sets such as the Bell 202 series.
2. Designates standard default parameter set.

Table 4-1. Configuration Code Selections

Code	Meaning
	Line Control Parameters (No Limit)
60(3)	Program line turnaround characters for half duplex
61(4)	Enable fail-safe disconnect
62(4)	Disconnect on receipt of EOT
63(4)	Disconnect on receipt of DLE EOT
64(5)	Enable paper out or carriage jam disconnect
65(4)	Enable no activity disconnect
66	Enable half-duplex operations without line turnaround character
	Transmission Control Parameters (No Limit)
70(3)	Program answerback memory (ABM)
71(4)	Auto-trigger ABM on connection
72	Enable printing of ABM contents (Local configuration report or code 82)
	Terminal Control Parameters (No Limit)
80(3)	Program ENTER on numeric pad (option required)
81	Enable recognition of device and format control ESC sequence commands from the communication line (DFC option required)
82	Enable local copy of transmitted data
83	Transmit DC3 or BREAK on printer busy, DC1 on ready
84	Do NEW LINE on receipt of LF character
85	Do NEW LINE on receipt of CR character
86	Transmit CR LF when "RETURN" is activated
87	Print all controls characters
88	Set compressed print only (compressed print option required)
89	Set absolute right margin at column 80
91	Set 8 line/2.54 cm (inch) only
92	Enable auto perforation skip over
93	Set absolute printed line length of 8 inches
96(6)	Transmit DC3 on paper out or carriage jam, DC1 when fault is cleared and RESET pressed (full duplex only)
	Invalid configuration code has been entered

Notes:

3. *Programming the line turnaround (LTA) character(s), answerback memory (ABM), and ENTER key (on optional numeric pad):* The LTA, ABM, and ENTER programming sequences are initiated by typing "60", "70", or "80" followed by RETURN. Any sequence of the 128 ASCII characters may now be typed. The programming sequence is terminated automatically upon entry of the last character (3 max for LTA and ENTER, 21 max for ABM); if fewer than the maximum number of characters are used, the programming sequence may be terminated by pressing HERE IS. The sequence "60" (or "70" or "80"), RETURN, HERE IS erases the corresponding parameters.
4. Valid only when parameter 11, 12 or 13 is enabled.
5. Valid only with parameter 11, 12 or 13 enabled if ROM set 03B/04B, 05B/06B or 07B/08B is installed. Valid for all communication modes if higher numbered ROM set is installed.
6. This feature is not available with ROM set 03B/04B, 05B/06B or 07B/08B installed.

character(s) (if programmed), and AAA....A represents the answerback memory (ABM) message (included if the ABM is programmed and configuration code 72 (print the ABM) is enabled).

NOTE

If a half-duplex line turnaround character (LTA) and ABM have been programmed (see paragraph 4.4.8) the configuration report will contain the LTA and may contain the ABM characters. If a programmed character is a control character, its special representation will be printed. Control character print formats are shown in Figure 9-1. Codes 60, 70, and 80 are not listed in the configuration report.

4.4 CHANGING THE CONFIGURATION PARAMETERS

All of the following configuration parameter changes may be accomplished only in the CONFIGURE Mode, entered as described in paragraph 4.4.10.

4.4.1 Entering the Configure Mode

The following procedure lists the steps necessary to place the Model 820 KSR in the CONFIGURE mode:

1. Place the LINE/•/LCL switch in the LCL position (Figure 4-1).

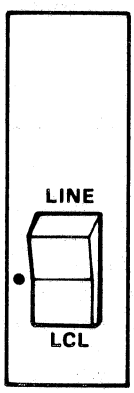


Figure 4-1. LINE/•/LCL Switch

2. Lift the terminal cover and place the CONFIGURE/OPERATE switch in the CONFIGURE (front) position (Figure 4-2).

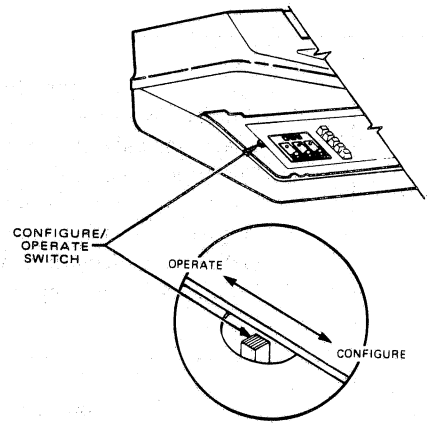


Figure 4-2. CONFIGURE/OPERATE Switch

3. Note that the Terminal Status Display (TSD), Figure 4-3, now contains a special symbol (⊏) in the left window and a two-digit code in the middle and right window. The ⊏ symbol always indicates that the terminal is in the CONFIGURE mode. The two-digit code represents one of the enabled parameters.

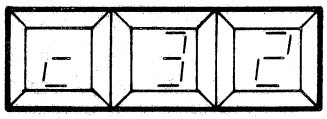


Figure 4-3. Terminal Status Display Window

4.4.2 Reviewing the Existing Parameters

With the Model 820 KSR in the CONFIGURE mode, each of the operating parameters currently enabled can be reviewed sequentially by using the TAB key in conjunction with the terminal status display (TSD). Each time the TAB key is pressed, the next higher numbered parameter code that is enabled will appear in the TSD. After the highest numbered enabled parameter is reached, the next TAB key depression will cause the TSD to sequence to the lowest enabled code.

Reviewing the parameter codes using the TAB key and the TSD does not affect the existing configuration in any way.

4.4.3 Changing the Communications Mode (11-16)

Parameter codes 11 through 16 are used to specify the communications mode of the Model 820 KSR. One parameter must be selected at any given time. To change the communications mode:

- Enter the codes (11-16) corresponding to the new parameter selection and press the RETURN key.

The Model 820 KSR will respond with a short audible tone when the change is complete. The previously enabled selection will be automatically deleted.

4.4.4 Changing the Transmission Rate (Speed) (21-29)

Only one transmission rate code may be enabled at any given time. To change the transmission rate:

- Enter the codes (21-29) corresponding to the new parameter selection and press the [RETURN] key.

The Model 820 KSR will respond with a short audible tone when the change is complete. The previously enabled selection will be automatically deleted.

4.4.5 Changing the Parity Selection (31-38)

Only one parity selection may be enabled at any given time. To change the parity selection:

- Enter the codes (31-38) corresponding to the new parameter selection and press the [RETURN] key.

The Model 820 KSR will respond with a short audible tone when the change is complete. The previously enabled selection will be automatically deleted.

4.4.6 Changing the Line Control (61-67), Transmission Control (71 and 72) and Terminal Control (81-89, 91-93) Parameters

The parameter codes in these three subsets are called ON/OFF parameters. This means simply that any number of these parameters can be enabled or deleted at any given time.

4.4.6.1 Enabling ON/OFF Parameters (61-67, 71-72, 81-89, 91-96). To enable any ON/OFF parameter:

- Enter the corresponding code and press the [RETURN] key.

The Model 820 KSR will signify operation complete by sounding a short audible tone.

4.4.6.2 Deleting Existing ON/OFF Parameters. One of two methods may be used to delete ON/OFF parameters from the terminal configuration:

1. Press the [TAB] key to sequence through each of the terminal configuration codes until the parameter to be deleted is displayed on the TSD. Press the [DEL] (delete) key once, and the terminal will respond by sounding a short audible tone and sequencing the TSD to the next enabled parameter code.

   OR

2. Enter the two-digit code for the parameter to be deleted and press the [DEL] key. The terminal will respond by sounding the audible tone to indicate that the parameter has been deleted and sequencing the TSD to the next enabled parameter code.

4.4.7 Identifying Entry Completion and Entry Errors

The Model 820 KSR does not attempt to complete a parameter change command until either the RETURN key or DEL key is pressed. When a command is completed one of the following events will occur:

1. If a valid command is terminated by pressing the RETURN key, the two-digit code will continue to be displayed in the TSD and an audible short tone will sound.

2. If a previously selected parameter is disabled by pressing the DEL key, the code for the next higher enabled parameter will be displayed and the audible short tone (1/12 second) will sound.

3. If an invalid command is entered the [¯] symbol will be displayed on the TSD, and the audible alarm (long one second tone) will sound.

If an entry error is detected prior to pressing the RETURN or DEL key, the erroneous code may be overstruck with the correct entry, followed by pressing RETURN or DEL. If the entry has been identified by the Model 820 KSR as invalid ([¯] displayed) no action has been taken and the valid command may be entered. Pressing the RESET key has no effect on the TSD. Entry of a valid parameter resets the error condition and the TSD.

4.4.8 Using the Special Programming Commands 60, 70, and 80

Half-duplex line turnaround (LTA) characters, the answerback memory (ABM) message, and the optional ENTER key are programmable from the keyboard. Any ASCII character may be entered.

4.4.8.1 Programming the Line Turnaround (LTA) Characters.

1. Enter the CONFIGURE Mode; Line/•/LCL switch in the CONFIGURE (front) position.

2. Enter [6] [0] [RETURN].

3. Type the characters desired. Each time a key stroke is entered, a short audible tone will sound and the number in the display will increment by one.

4. Programming is terminated when (a) 3 ASCII characters have been entered as LTA characters have been entered as LTA characters or (b) the [HERE IS] key is depressed. The terminal returns to the CONFIGURE Mode when programming is terminated.

NOTE

The sequence [6], [0], [RETURN], [HERE IS] will delete any line turnaround characters previously entered.

4.4.8.2 Programming the Answerback Memory (ABM).

1. Enter the CONFIGURE mode; LINE/•/LCL switch at LCL position, CONFIGURE/OPERATE switch in the CONFIGURE (front) position.

2. Enter [7] [0] [RETURN].

3. Type the characters desired. Each timne a key stroke is entered, a short audible tone will sound and the number in the display will increment by one.

4. Programming is terminated when (a) 21 ASCII characters have been entered into the ABM, or (b) the [HERE IS] key is depressed. The terminal returns to the CONFIGURE mode when programming is terminated.

NOTE

The sequence [7], [0], [RETURN], [HERE IS] will erase the contents of the answerback memory.

4.4.8.3 Programming the Optional ENTER Key (Numeric Keypad Option).

1. Enter the CONFIGURE mode; LINE/•/LCL switch in LCL position, CONFIGURE/OPERATE in CONFIGURE (front) position.

2. Enter [8] [0] [RETURN].

3. Type the characters desired. Each time a keystroke is entered, a short audible tone will sound and the number in the display will increment by one.

4. Programming is terminated when (a) 3 ASCII characters have been programmed, or (b) the [HERE IS] key is depressed. The terminal returns to the CONFIGURE mode when programming is terminated.

NOTE

The sequence [8], [0] [RETURN], [HERE IS] will erase the contents of the ENTER key message.

4.4.9 Changing Protected or Default Parameter Sets (01-08)

If either the Protected or Default Configuration option is included, it is possible to install a new, complete operating set of parameters by typing in only one 2-digit code. Up to eight sets can be included in the option. They are identified by the codes 01 through 08.

- To load a new Model 820 KSR operating parameter set, type the corresponding code (01-08), and press the [RETURN] key.

The Model 820 KSR will respond with a short audible tone and the previously installed parameter set will be automatically replaced by the new parameter set.

NOTE

If the associated configuration option is *not* installed, the Model 820 KSR will identify the codes 01 through 08 as invalid entries. If the option *is* installed, code 09 will be identified as an invalid entry.

4.4.10 Terminating the Configure Mode

Once operating parameter changes are completed, the CONFIGURE/OPERATE switch must be returned to the operate (rear position) in order to terminate the special CONFIGURE mode. No operations except parameter changes are possible while operating in the CONFIGURE mode.

4.5 VERIFYING A PROGRAMMED ABM SEQUENCE

Ensure that parameter 72 is enabled.

1. Return to the OPERATE mode.
2. Depress [CTRL], [SHIFT], and [3] - simultaneously. The configuration report will be printed containing the programmed ABM and LTA characters.

NOTE

Control character symbolization is found in Figure 9-1.

If the programmed sequence is correct and the configuration process is complete, no other actions are necessary. If further changes are needed, return to CONFIGURE mode and repeat the programming sequence or complete the configuration changes.

NOTE

If code 72 is not desired for normal operation, then it must be disabled after the ABM has been verified.

4.6 DEFAULT PARAMETERS

The Model 820 KSR has a predetermined set of standard default parameters that are stored in permanent memory. If the normal configuration memory should fail to pass the automatic test when the terminal is switched ON, the terminal is automatically configured to the default parameters and an error code is displayed in the TSD. The terminal can also be configured to the default parameters and an error code is displayed in the TSD. The terminal can also be configured to the default parameters by entering the parameter code 09 in the CONFIGURE mode. The default parameters of the standard terminal (code 09) are listed below:

13 Full duplex

23 300 baud

32 Even parity—no check

If a Multiple Default, Multiple Protected Configuration, or Protected ABM option is installed, the Model 820 KSR automatically loads the

parameters associated with code set 01 rather than 09 if a failure occurs during the power-up automatic test.

NOTE

If the Multiple Default Configuration, Multiple Protected Configuration, or Protected ABM option is installed, parameter 09 is not a valid code. See Section 6 for description of the operation of these options.

Section 5

Using the Terminal Format Control Capability

5.1 INTRODUCTION

There are two types of format control capability provided by the Model 820 KSR.

The first type of control is by the setting of configuration parameters which modify the operating limits of the terminal. This type of control is available as a standard feature on all terminals. (See Section 4 for a detailed discussion of configuring the terminal.)

The second type of control is by the use of ESCape command sequences. In the basic terminal, the ESCape sequence commands are provided which allow you to set the top of form and to establish a form length of up to 112 lines. The available ESCape sequence commands may also be expanded by the Device/Forms Control option, to include a complete set of format control commands.

5.2 DETERMINING THE CURRENT FORMAT PARAMETERS

A useful feature of the Model 820 KSR is its ability to provide a printed report of the settings of the format parameters. This report is initiated by:

1. Placing the LINE/•/LCL switch to the LCL or (•) STANDBY position

2. Simultaneously depressing

   CTRL SHIFT 5

The terminal responds by printing a report containing digits in the following format:

AAA;BBB;CCC;DDD;EEE;F;GG

Where:

- AAA = form length in lines (001-112)
- BBB = left margin column number (001-218)
- CCC = right margin column number (001-218)
- DDD = top margin line number (001-112)
- EEE = bottom margin line number (001-112)
- F = line spacing (6 = single space 6 LPI, 8 = single space 8 LPI, 4 = double space 8 LPI, 3 = double space 6 LPI
- GG = number of characters per inch (05 = expanded 10 CPI, 08 = expanded 16.5 CPI, 10, 16 = 16.5)

Using this report, you can determine the current setting of the form length, margins, lines per inch spacing, and the characters per inch spacing in order to aid in setting the terminal to print on new forms. Figure 5-1 is a sample of a forms report which has been labeled for explanation.

5.3 THE CONFIGURATION PARAMETER CONTROLS

Five configuration parameters have been provided which may be used to affect the format of the terminal's printing. Special care should be taken when using this type of control if the Device/Forms Control option is installed in your terminal as enabling of these configuration parameters will limit the capability of the terminal to respond to ESCape command sequences.

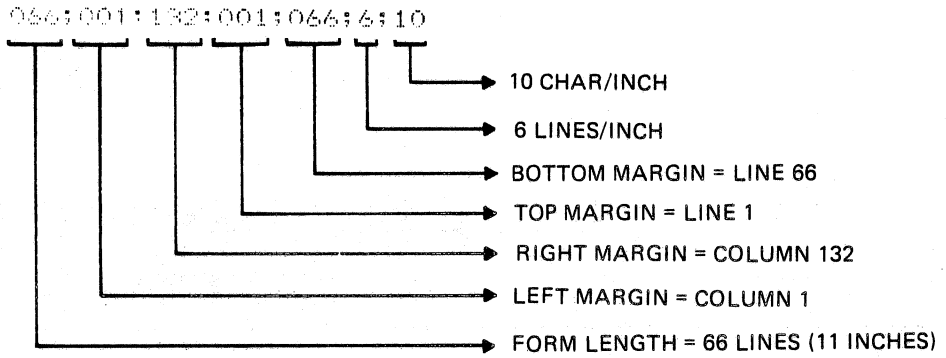


Figure 5-1. Sample Forms Report

The configuration parameter controls and their control codes are described as follows:

88: Enabling Parameter 88 locks the printer in the compressed print mode if the compressed print option is present. This will prevent unintentional changes of horizontal pitch which could result in printing beyond the right edge of the form.

Disabling this parameter will place the terminal in the 10 CPI printing mode.

NOTE

With this parameter enabled, you may still use the 16.5 CPI expanded printing available with Device/Form Control (DFC) option.

89: Enabling Parameter 89 sets the absolute right margin at column 80 to prevent unintentional printing beyond the right edge of the form when the Model 820 KSR terminal is used in a network of 80 column format terminals.

Disabling this parameter sets the absolute right margin at the column defined in the default parameters.

91: Parameter 91 locks the terminal in 8 LPI line spacing.

Disabling this parameter places the terminal in the 6 LPI mode.

NOTE

With this parameter enabled, you may still use the double space, 8 LPI spacing available with the DFC option.

92: Enabling Parameter 92 sets the automatic perforation feature. When set, the top margin is set to line 3 and the bottom margin is set at one line from the bottom of the form. This provides a 3-line perforation skip.

Disabling this parameter sets the margin limits to "top-of-form" and "last-line-of-form."

NOTE

This parameter also sets a minimum form length of one inch (6 lines if in 6 LPI or 8 lines if in 8 LPI) when it is enabled.

93: Enabling Parameter 93 sets the absolute printed line length to 8 inches to facilitate use of the terminal with 8½ inch wide paper. This will permit a maximum of 80 characters in a line when using 10 CPI and 132 characters in a line when using 16.5 CPI.

Disabling this parameter sets the absolute right margin at the limits defined by the default parameters.

The procedure for enabling/disabling configuration parameters is explained in Section 4.

5.4 THE LOCAL ESCAPE SEQUENCE COMMANDS

The local ESCape sequence commands and their definitions are listed in Table 5-1. Only the FORM SIZE commands listed in Table 5-1 are available on all Terminals. The other listed commands are available as a part of the Device/Forms Control Option and will function only when this option is installed on your terminal. Additionally, the printer control commands for compressed printing will function only when the compressed print option is also installed on your terminal.

When using the ESC commands of Table 5-1, set the LINE/•/LCL switch as indicated in the table to the LCL or STANDBY (•) position. Each LOCAL ESC command consists of depressing the [ESC] key followed by depressing one or more of the other keys of the keypad as indicated in Table 5-1. Appropriate action will be taken by the Model 820 KSR Terminal when it detects any valid local ESC command, and the completion of a local command will be signaled by a short (1/12 second) audible tone. Invalid command sequences will be signaled by a long (1 second) audible tone and the activation of the invalid escape sequence status code flashing in the Terminal Status Display (TSD). Format parameters established by ESC commands are stored in a nonvolatile memory and are retained when the power is switched OFF.

Raised lettering above the keyboard is provided to assist in performing the functions of the Local ESC Commands. A more complete guide is found in the operator's reference cards.

5.5 THE DEVICE/FORMS CONTROL (DFC) OPTION

Two different sets of ESCape sequence commands are implemented in the DFC option. One set, the LOCAL SET (listed in Table 5-1) is intended for use by the Model 820 KSR Terminal operator. It provides the operator with a full range of commands needed for forms setup. The second set, the LINE SET is described in Section 9, and is intended for use by remote equipment through the communications capability of the terminal.

The DFC OPERATOR COMMANDS enable the operator to use the following DFC features:

- Adjustable line and character spacing.
- Adjustable forms margins (top, bottom, left, right).
- Adjustable tab settings (horizontal and vertical).
- Selectable terminal status display (line or column count).

Commands for these functions are listed in Table 5-1; however they will not be available unless your terminal has the DFC option installed.

5.6 RECOMMENDED SEQUENCE FOR SETTING UP A NEW FORM

The following sequence is recommended for setting up a new form. It is provided as a guide to illustrate all the steps that an operator may perform. You do not have to use all the steps or features; however, you should follow the order presented, or you may disable previously selected settings.

1. Enter LOCAL or STANDBY mode. (Place LINE/•/LCL switch to LCL or STANDBY (•) position.)
2. Select the number of lines per inch you require.
3. Enter form length. Establish the top of the form.
4. Select the horizontal character spacing you require.
5. Set margins.
6. Set tabs.
7. Store format in memory (when desired).

By performing the previous steps in the order indicated you can set up the Model 820 KSR Terminal to print on your forms. These settings will always be retained in a "memory" for your future use until you decide to change these settings.

5.7 VERTICAL LINE SPACING

Four commands are available to set the printer line spacing. The command sequences are:

[ESC] [-] Set 6 lines per inch (single space).

[ESC] [=] Set double space 6 lines per inch (effective 3 LPI).

[ESC] [_] Set 8 lines per inch (single space).

[ESC] [+] Set double space 8 lines per inch (effective 4 LPI).

NOTE

Changing the vertical line spacing to or from 6 and 8 lines per inch will cause the terminal to clear the top and bottom margins.

Reference Figure 5-2 for examples of 6 and 8 LPI spacing.

Table 5-1. Forms Setup Commands

FUNCTION TYPE	LINE/•/LCL Switch at LCL or (•) STANDBY	DEFINITION OF COMMANDS
Form Size	[ESC] [5] [*N*] [;] [ESC] [5] [;] [ESC] [5] [0] [;]	Form Length = *N*; Top of Form = Present Line Top of Form = Present Line Bottom of Form = Present Line
Printer Control (Requires DFC Option)	[ESC] [-] (MINUS) [ESC] [=] [ESC] [_] (UNDERLINE) [ESC] [+] [ESC] [>] [ESC] [.] [ESC] [<] [ESC] [,]	6 Lines/Inch (Single Space, 6 LPI) Double Space, 6 LPI (3 Line/Inch) 8 Lines/Inch (Single Space, 8 LPI) Double Space, 8 LPI (4 Line/Inch) 10 Char/Inch (Standard Print) Expanded Print, 10 CPI (5 Char/Inch) 16.5 Char/Inch (Compressed Print)* Expanded Print, 16.5 CPI (8.25 Char/Inch)*
Display Control (Requires DFC Option)	[ESC] [LINE FEED] [ESC] [SPACE BAR]	Display Current Line Number Display Next Column Number
Form Margins (Requires DFC Option)	[ESC] [6] [ESC] [DEL] [6] [ESC] [7] [ESC] [DEL] [7] [ESC] [8] [ESC] [DEL] [8] [ESC] [9] [ESC] [DEL] [9] [ESC] [0]	Left = Present Column Left = Column 1 Right = Present Column Right = Default Value Top = Present Line Top = Default Value Bottom = Present Line Bottom = Default Value Clear All To Default Values
Tabulation (Requires DFC Option)	[ESC] [1] [ESC] [2] [ESC] [3] [ESC] [4]	Set Horizontal Tab At Present Position Clear Horizontal Tab At Present Position Set Vertical Tab At Present Position Clear Vertical Tab At Present Position
Forms Storage (Requires DFC Option)	[ESC] [/] [1] or [2] [ESC] [\] [1] or [2] [ESC] [\] [0]	Store Present Device/Forms Parameters In Memory 1 or 2 Recall Device/Forms Parameters From Memory 1 or 2 Load Default Device/Forms Parameters

*These commands require the compressed print option to be installed.

6 LINES PER INCH PRINTING

SAMPLE 1

```
THIS PRINT SAMPLE WAS PRODUCED
USING A HORIZONTAL PITCH OF 10
CHARACTERS PER INCH AND A VERTICAL
LINE SPACING OF 6 LINES PER INCH
!"#$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz{|}~
!"#$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz{|}~
```

SAMPLE 2

```
THIS IS A SAMPLE
OF DOUBLE WIDTH
AND DOUBLE STROKE
10 CPI PRINTING
 !"#$%&'()*+,-./
0123456789:;<=>?
@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_
`abcdefghijklmno
pqrstuvwxyz{|}~
```

SAMPLE 3

```
THIS PRINT SAMPLE WAS PRODUCED
USING A HORIZONTAL PITCH OF 16.5
CHARACTERS PER INCH AND A VERTICAL
LINE SPACING OF 6 LINES PER INCH
!"#$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz{|}~
!"#$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz{|}~
```

SAMPLE 4

```
THIS IS A SAMPLE
OF DOUBLE WIDTH
AND DOUBLE STROKE
16.5 CPI PRINTING
 !"#$%&'()*+,-./
0123456789:;<=>?
@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_
`abcdefghijklmno
pqrstuvwxyz{|}~
```

8 LINES PER INCH PRINTING

SAMPLE 5

```
THIS PRINT SAMPLE WAS PRODUCED
USING A HORIZONTAL PITCH OF 10
CHARACTERS PER INCH AND A VERTICAL
LINE SPACING OF 8 LINES PER INCH
!"#$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz{|}~
!"#$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz{|}~
```

SAMPLE 6

```
THIS IS A SAMPLE
OF DOUBLE WIDTH
AND DOUBLE STROKE
10 CPI PRINTING
 !"#$%&'()*+,-./
0123456789:;<=>?
@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_
`abcdefghijklmno
pqrstuvwxyz{|}~
```

SAMPLE 7

```
THIS PRINT SAMPLE WAS PRODUCED
USING A HORIZONTAL PITCH OF 16.5
CHARACTERS PER INCH AND A VERTICAL
LINE SPACING OF 8 LINES PER INCH
!"#$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz{|}~
!"#$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz{|}~
```

SAMPLE 8

```
THIS IS A SAMPLE
OF DOUBLE WIDTH
AND DOUBLE STROKE
16.5 CPI PRINTING
 !"#$%&'()*+,-./
0123456789:;<=>?
@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_
`abcdefghijklmno
pqrstuvwxyz{|}~
```

SAMPLES 1 AND 5 ARE AVAILABLE ON ALL TERMINALS
SAMPLES 3 AND 7 REQUIRE THE COMPRESSED PRINT OPTION
SAMPLES 2 AND 6 REQUIRE THE DEVICE/FORMS CONTROL (DFC) OPTION
SAMPLES 4 AND 8 REQUIRE THE DFC AND COMPRESSED PRINT OPTIONS

Figure 5-2. Model 820 KSR Printing

5.8 ESTABLISHING FORM LENGTH AND TOP OF FORM

The form length and top of form are set by using the special function keys [FORM ADV], [↑], [↓], and the command sequences [ESC] [5] [N] [;] or [ESC] [5] [0] [;] and [ESC] [5] [;] entered from the keyboard.

Once the form length is entered, each time the FORM ADV key is pressed longer than ¼ second, the terminal printer will advance the paper to the top margin of the next form. Pressing the FORM ADV key less than ¼ second will result in a paper advance of one line.

5.8.1 Setting Form Length; Paper Length Known

(Maximum length setting available is 14 inches.)

1. Set terminal to LCL or (•) STANDBY.

2. Simultaneously depress [CTRL] [SHIFT] [5]. Terminal responds with digits printed in the following format:

   AAA;BBB;CCC;DDD;EEE;F;GG

3. Determine if in 6 lines per inch or 8 lines per inch from report.

   a. If F = 3 or 6 then the terminal is in 6 LPI.

   b. If F = 4 or 8 then the terminal is in 8 LPI.

4. Align paper using [FORM ADV], [LINE FEED], [↑], and [↓]. Paper alignment may be checked by typing some characters as illustrated in Figure 5-3.

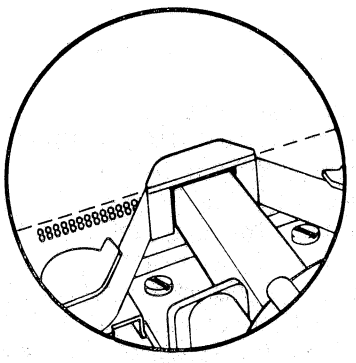


Figure 5-3. (Reference) Printhead Positioning (Below) to Set Form Length

5. Determine the number of lines in the form from Table 5-2 or multiply the length in inches by the basic pitch (6 or 8) determined in step 3.

6. Enter

   [ESC] [5] [N] [N] [N] [;],

   where *NNN* is the number of lines from step 5. (Leading zeros not required.) The terminal will acknowledge the command with short audible tone.

NOTE

If auto perforation is set the terminal will move to line 3 of the form.

5.8.2 Setting Form Length; Paper Length Unknown

1. Set terminal to LCL or STANDBY (•).

2. Simultaneously depress [CTRL], [SHIFT], [5]. Terminal responds with digits printed in the following format:

   AAA;BBB;CCC;DDD;EEE;F;FF

Table 5-2. Number of Lines Set For Standard Forms

Value of F	Form Length In Inches										
	3.0	3.5	4.0	5.5	6.0	7.0	8.0	8.5	11	12	14
3 or 6	18	21	24	33	36	42	48	51	66	72	84
4 or 8	24	28	32	36	48	56	64	68	88	96	112

3. Determine if the terminal is in 8 line/inch (LPI) or 6 LPI from report.

   1. If F = 3 or 6 then the terminal is in 6 LPI.

   2. If F = 4 or 8 then the terminal is in 8 LPI.

4. Align paper using [FORM ADV], [LINE FEED], [↑], and [↓] special function keys. Paper alignment may be checked by typing some characters (as illustrated in Figure 5-3).

5. Enter maximum form length:

   a. For 6 LPI: enter
   [ESC] [5] [8] [4] [;]

   b. For 8 LPI:enter
   [ESC] [5] [1] [1] [2] [;]

The terminal will acknowledge the completion by a short audible tone.

NOTE

If AUTO PERF SKIP (Configure Code 92) is set, the terminal will move to line 3 upon completion of this step.

6. Depress [LINE FEED] key to advance paper to the last line of the form as illustrated in Figure 5-4.

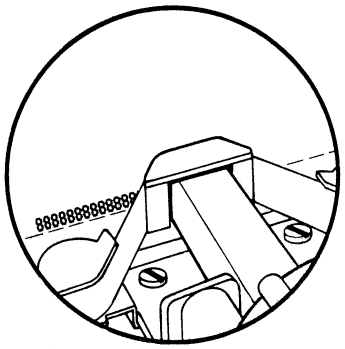


Figure 5-4. Printhead Positioning to Set Bottom of Form

NOTE

If paper is advanced too far, steps 4 and 5 should be repeated.

7. Enter

   [ESC] [5] [0] [;]

   to set the bottom of the form.

   (If auto perforation skip is set the paper will advance to line 3 of the next form.) Terminal will acknowledge completion of command by a short audible tone.

5.8.3 Setting the Top of Form

When the form length is correct and only the top of form needs to be set the following procedure may be used:

1. Ensure that the LINE/•/LCL switch is set to Standby (•) or LCL position.

2. Align the printhead to the first line under the perforation. With [FORM ADV], [↑] and [↓], and [LINE FEED]. This may be verified by typing a character on the keyboard, as illustrated in Figure 5-3.

3. Enter

   [ESC] [5] [;]

from keyboard to set top of form. The terminal will sound a short audible tone and the paper will move to the top margin if the top margin is not at line 01.

5.9 SETTING THE HORIZONTAL CHARACTER SPACING

Four commands are available to set the horizontal character spacing provided by the printer. These commands are:

[ESC] [>] Set 10 characters per inch spacing.

[ESC] [.] Set EXPANDED 10 characters per inch spacing (effective 5 CPI).

[ESC] [<] Set 16.5 characters per inch spacing. (Requires the compressed print option.)

[ESC] [,] Set EXPANDED 16.5 characters per inch spacing (effective 8.25 CPI). (Requires the compressed print option.)

NOTE

Changing the horizontal spacing to or from 10 and 16.5 characters per inch will cause the terminal to clear the left and right margins.

Reference Figure 5-2 for examples of different horizontal character spacing.

5.10 SETTING MARGINS

Once the desired form length, line spacing, and horizontal spacing have been set, it is sometimes advantageous to establish print margins (i.e., the boundaries for printing on a form). Refer to Figure 5-5 for a pictorial representation of form margins. Commands are available for selecting the line number or column number display, for individually setting all four margins and for individually or collectively clearing these margins. These commands are shown in Table 5-1.

5.10.1 Selecting the TSD Line or Column Display

The ability to display active line or column number of the terminal is provided to simplify the forms setup procedure. The active line is defined as the line being printed and the active column is defined as the next print position. The display mode is selected by entering the appropriate command sequence.

[ESC] [SPACE] Select column number display.

[ESC] [LINE FEED] Select line number display.

5.10.2 Clearing Margins

In order to set a new margin outside of an area already bounded by established margins, it is necessary to first clear the existing margin. This may be done individually or collectively (all margins with one command). The commands for clearing margins individually are:

[ESC] [DEL] [6] Set left margin to default value.

[ESC] [DEL] [7] Set right margin to default value.

[ESC] [DEL] [8] Set top margin to default value.

[ESC] [DEL] [9] Set bottom margin to default value.

or collectively

[ESC] [0] Set all margins to default values.

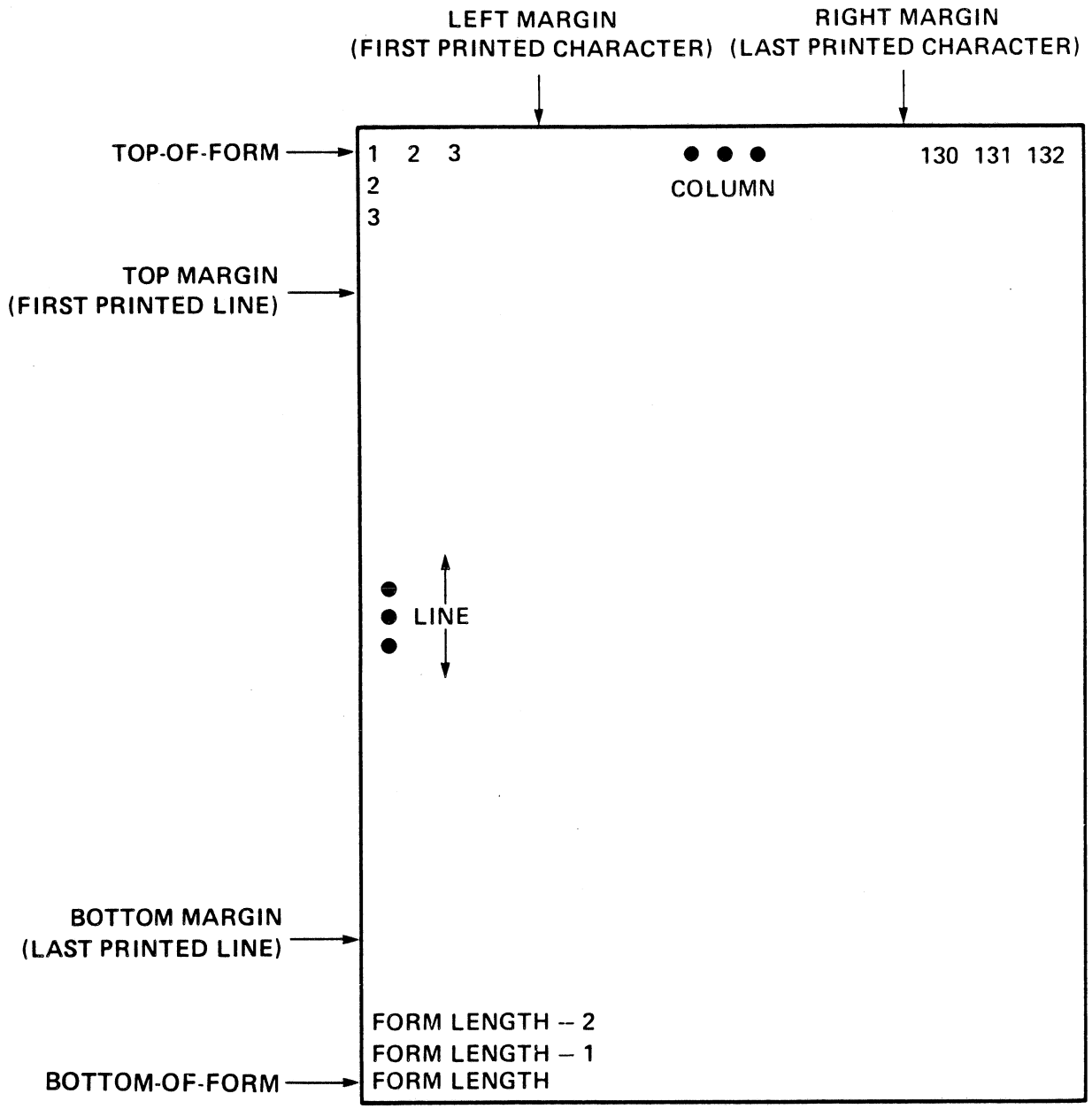
DEFAULT MARGIN VALUES ARE:

Left margin = column number 001

Top margin = line number 01

Right margin =
- Column number 132 if in 10 CPI horizontal spacing
- Column number 218 if in 16.5 CPI horizontal spacing

Bottom margin = last line of form



TOP OF FORM = LINE 1

$1 \leq$ FORM LENGTH $\leq$ 84 at 6 LPI or 112 at 8 LPI

$1 \leq$ TOP MARGIN $\leq$ BOTTOM MARGIN $\leq$ FORM LENGTH

$1 \leq$ LEFT MARGIN $\leq$ RIGHT MARGIN $\leq$ 132 at 10 CPI or 218 at 16.5 CPI

Figure 5-5. Form Margin Reference

NOTE

The CONFIGURATION parameter codes 88-93 modify the operating limits of the Model 820 KSR when they are enabled and specifically codes 89, 92, and 93 place limits on the acceptable values that form margins can have. The enabling of these codes will therefore affect the default positions of the margins as described below:

- If code 92 (auto perforation skip) is enabled, the top margin default will be line 03 and the bottom margin default will be at form length minus one line.
- If code 89 (absolute right margin at column 80) is enabled, the right margin default will be at column 80.
- If code 93 (absolute print line length of 8 inches) is enabled and code 89 is disabled, the right margin default will be at column 80 when using 10 CPI and column 132 when using 16.5 CPI.

5.10.3 Setting Top and Bottom Margins

The top and bottom margins establish the area within the form where data may be printed. Refer to Figure 5-5. When the bottom margin is reached, the Model 820 KSR will advance the paper to the top margin of the next form. To set the top and bottom margins:

1. Press the [ESC] key and then the [LINE FEED] key; this causes the TSD to display the line number.
2. Press the [FORM ADV] key to advance the paper to the top of the next form.
3. Press the [LINE FEED] key to position the printhead to the line where the first line is to be printed.
4. Press the [ESC] key and then the [8] key; this sets the top margin.
5. Press the [LINE FEED] key to position the printhead to the line where the last line is to be printed.
6. Press the [ESC] key and then the [9] key; this sets the bottom margin.

5.10.4 Setting Left and Right Margins

The procedure for setting the left and right margins is as follows:

1. Press the [ESC] key and then the [SPACE BAR] ; this causes the TSD to display the column number.
2. Press the [SPACE BAR] to position the printhead to the column where the first character is to be printed.
3. Press the [ESC] key then the [6] key; this sets the left margin.
4. Press the [SPACE BAR] to position the printhead to the column where the last character is to be printed.
5. Press the [ESC] key and then the [7] key; this sets the right margin.

5.11 SETTING OR CLEARING THE TAB STOPS

Two types of tab stops can be set by the Model 820 KSR terminal: 1) horizontal and 2) vertical. The horizontal and vertical tab stops are controlled by the following ESC sequences:

[ESC] [1]	Set horizontal tab at present column.
[ESC] [2]	Clear horizontal tab at present column.
[ESC] [3]	Set vertical tab at present line.
[ESC] [4]	Clear vertical tab at present line.

The tab stops (both vertical and horizontal) are set in the same manner as the margins, except that the ESC sequences listed above are used. The printhead is positioned with either the [SPACE BAR] or [LINE FEED] key to the desired position and the correct ESC sequence is entered.

5.12 STORING A "FORM" IN MEMORY

The Model 820 KSR has the capability to store up to two forms in its memory. You may require this feature when you have the need to use the same form setups on numerous occasions and do not want to perform a manual setup for each use. To "store a form" in memory, proceed as follows:

1. Set up the terminal to use the form you desire following the procedures in the previous paragraphs of this section.

2. Enter the sequence

   [ESC] [/] [1] or [2] ;

   1 or 2 = the number you assign which designates the form in memory storage. You have now stored your form in the memory. The stored form will be available for recall exactly as you stored it until you change it by storing another form in the same number (1 or 2).

5.13 RECALLING A FORM FROM MEMORY

In order to recall your stored form from memory for use, proceed as follows:

1. Physically align the paper to the top of the form.

2. Enter the sequence

   [ESC] [\] [1] or [2].

You have now recalled your stored form. If the form recalled exceeds any of the current operating limits established by configuration code selection, the terminal will indicate an error by an audible tone and flashing a status code in the TSD. This error condition may be cleared by pressing [RESET]. If you desire to use the stored form at this point, it will be necessary to change the current configuration of the terminal (parameters 88 through 93; see Section 4).

5.14 (LOADING) THE DEFAULT FORM

Loading the default form will return your terminal to a predefined set of default parameters. This may be helpful in order to determine a beginning point to which you may then make desired changes.

To load the default form proceed as follows:

1. Physically align the paper to the top of the form.

2. Enter the sequence

   [ESC] [\] [0]

You have now loaded the default parameters which are defined as follows:

Horizontal pitch = 10 characters per inch (CPI)

Vertical line spacing = 6 lines per inch (LPI)

Form length = 66 lines (11 inches)

Tab stops = all tab stops are cleared (no tab stops are set)

Margins = set to default margin values (refer to paragraph 5.10.2 for these values).

NOTE

The CONFIGURATION parameter codes 88-93 modify the operating limits of the Model 820 KSR when they are enabled. These parameters will affect the default form as described below:

Codes 89, 92 and 93 will affect the default margin values (refer to paragraph 5.10.2).

If code 88 (compressed printing only) is enabled, the horizontal pitch will be set at 16.5 CPI.

If code 91 (8 line/inch only) is enabled, the vertical line spacing will be set at 8 lines/inch and the form length will be set to 88 lines (11 inches).

5.15 THE DEVICE FORMS CONTROL OPTION LINE COMMANDS

The DFC line commands provide the same basic type of commands as those available in the local mode, although different ESC sequences are used. Also available are some additional commands, designed to enhance format control from the communications line. Commands of the line command set may be entered from the keyboard when the terminal is in the Local or Standby mode. In general, the line commands include the local features plus the following additional features:

- Form margins can be specified without moving printhead.
- Multiple tab stops can be set with one command, without moving the printhead.
- All tab stops of the same type (vertical or horizontal) can be cleared with one command without moving the printhead.
- Horizontal and vertical printhead movements can be specified relative to current position, or relative to line 1 or column 1.
- Printer ON/OFF control is available.
- Keyboard "lock"/"unlock" control is available.
- Status and configuration reports can be transmitted.

For further detailed information refer to Section 9.

Section 6

Using the Printer Control, Configuration, Protected Answerback, and Keyboard Options

6.1 INTRODUCTION

The Model 820 KSR is available with a number of optional features designed to increase printer control capabilities and simplify selection of operating parameters. This section presents operating instructions and other information on the following options:

- Compressed Print Option (PCF)
- User-defined Configuration Options
  - —Multiple Default (MDP)
  - —Multiple Protected (MPP)
- Protected Answerback Memory Option (MAP)

To determine which options are included with your terminal, follow the procedure in paragraph 1.6. The blanks checked on the Printer Configuration Label indicate which options were included in your terminal at the time of purchase, or have been added at some later date.

6.2 COMPRESSED PRINT OPTION (PCF)

The compressed print option (PCF) is closely related to another option called the device/forms control option (MFG). Table 6-1 depicts the four possible combinations of these two options one of which is contained in your terminal.

To enable the various horizontal pitches on your Model 820 KSR terminal, proceed as follows (assuming that option PCF is installed):

Table 6-1. Compressed Print Option

Four Possible Combinations		Horizontal Pitch Capabilities
Device/Form Control	Compressed Print	
MFG	PCF	10 CPI only
MFG	✓ PCF	10 CPI, or 16.5 CPI
✓ MFG	PCF	10 CPI, or 5 CPI
✓ MFG	✓ PCF	10 CPI, 5 CPI, 16.5 CPI or 8.25 CPI

- Device/Forms Control Option (MFG) not installed

With the MFG option not installed, the horizontal pitch changes, between 16.5 CPI and 10 CPI, must be made by enabling and disabling parameter 88 during the configuration process. To change pitches follow these instructions:

1. Enter CONFIGURE mode as explained in Section 4.
2. To choose 16.5 CPI horizontal pitch, depress [8] [8] [RETURN] . If 16.5 CPI is already enabled and 10 CPI is desired, depress [8] [8] [DEL] .
3. Exit CONFIGURE mode as explained in Section 4. The terminal is now configured for the pitch chosen.

- Device/Forms Control Option (MFG) installed

  With the MFG option installed in addition to the compressed print (PCF) option, changes between 16.5 CPI and 10 CPI can be made via parameter 88 as in the above explanation. However, two extra pitch choices are now available, and these cannot be implemented by enabling or disabling parameter 88 during the configuration process. Therefore, parameter 88 should not be implemented on an MFG-equipped machine unless *only* 16.5 CPI compressed print is desired. If a choice between 5 CPI, 10 CPI, 8.25 CPI, and 16.5 CPI is desired, ESCape sequences are used to select the pitch either from the keyboard in LOCAL mode, or from the communications line in LINE mode. The process for doing this in LOCAL mode is explained below; a more detailed explanation for both LOCAL and LINE pitch changes is found in Sections 5 and 9.

1. With the LINE/•/LCL switch in LCL position, depress momentarily the [ESC] key followed by one of the following keys, depending on the horizontal pitch desired:

   [.] 5 CPI (double-wide standard)
   [,] 8.25 CPI (double-wide compressed)
   [>] 10 CPI (standard)
   [<] 16.5 CPI (compressed)

2. The Model 820 KSR will now print all data entered in LOCAL mode, or that data received in LINE mode, before another pitch change command, in the horizontal pitch style chosen.

NOTE

Enabling parameter 88 at the time of terminal configuration prohibits the Model 820 KSR from acting upon ESCape sequences dealing with pitch changes to 5 CPI or 10 CPI. The terminal will be "locked" into compressed print mode and can only print at 16.5 CPI or 8.25 CPI (via an ESCape sequence) until parameter 88 is disabled.

The 16.5 CPI pitch allows full 132-column lines on 8½ inch wide forms, and 218-column lines on standard 14 7/8 inch wide forms.

6.3 USER-DEFINED CONFIGURATION OPTIONS

If the blanks next to the designations MDP or MPP on the Printer Configuration Label of the Model 820 KSR are checked, your terminal is equipped with one of the user-defined configuration options. These allow the user to enter any one of the configuration codes 01 through 08 reserved for this purpose by the terminal. Selection of one of these codes at the time of terminal configuration enables one of the possible eight separate and complete sets of configuration parameters. These parameters sets are programmed into a permanent read-only type memory device which is included in terminals containing either of these options at the time of purchase, or installed with the option kit at a later date. A second label is affixed to the inside of the terminal cover if one of these options is installed. This label shows the parameters enabled by selecting codes 01 through 08 and serves as a reference to the operator.

6.3.1 Multiple Default Configuration Option

If the Model 820 KSR is equipped with the MDP (Multiple Default Configuration) option, any of the stored configuration sets 01 through 08 can be selected in the following manner:

1. Enter CONFIGURE mode as explained in Section 4.

2. Select any of the sets 01-08 by depressing momentarily the [0] key followed by the second numeral desired and [RETURN]. The terminal will respond with an audible tone, indicating that the Model 820 has accepted the configuration set chosen.

3. If any changes are desired in the new parameter set, they may now be entered to replace or supplement the chosen set parameters, via the ordinary parameter selection method detailed in Section 4.

NOTE

The last parameters enabled, including

those retained from the Default Configuration set, will be stored in nonvolatile memory and "remembered" even when power is switched off. If any of the configuration sets stored in the option memory device are selected after any changes have been made, those changes will be superseded by the newly selected set. Modifications may then be made to the latest configured set.

Any attempt to select a configuration code for which no parameter set is defined causes configuration error status.

6.3.2 Multiple Protected Configuration Option

The Multiple Protected Configuration (MPP) option is very similar in purpose and selection to the MDP option. In fact, the only difference is that once one of the parameter sets of the installed option is selected, no individual parameters of that set may be modified. The entire set chosen may be replaced by entering another of the parameters 01 through 08, following steps 1 and 2 of the previous paragraph.

NOTE

The last set chosen will be stored in nonvolatile memory and "remembered" even when power is switched off. It is not necessary to reenter configuration parameters every time the machine is powered off and on again.

Any attempt to select a configuration code for which no parameter set is defined causes configuration error status.

6.4 PROTECTED ANSWERBACK MEMORY OPTION (MAP)

Normally, the Answerback Memory (ABM) message is manually programmed into your Model 820 KSR by the user at the time of terminal configuration, if an ABM message is desired. It can be changed by entering the CONFIGURE mode and reprogramming the message, as explained in Section 4. If the MAP blank is checked on your terminal's Printer Configuration Label, it is equipped with the Protected ABM option, which consists of a nonalterable memory device containing one and only one ABM message. This message is specified at the time of your terminal's purchase, and cannot be changed by the operator.

The MAP option is exactly the same as the MDP option, except for the inclusion of the protected ABM message. To select the default character set containing the protected ABM message, follow the steps in paragraph 6.3.1 and select parameter set 01. Any of the parameters of the set may be changed as before, and the entire set can be replaced, but the ABM message cannot be altered. The protected ABM message will not be included in any LOCAL mode report, but will be transmitted upon request similar to an ordinary ABM message.

6.5 ALTERNATE CHARACTER SET OPTION—ASCII/APL

The optional APL keyboard shown in Figure 6-1 enables the terminal to transmit and receive both the standard ASCII and APL characters. The SO-SI/LOCK switch and ALTN CHAR indicator shown in Figure 6-2 are added to the control panel with this option installed. The SO-SI/LOCK switch in conjunction with the **O**, **N**, and **CTRL** keys and the ASCII control codes SI and SO, permit selection of either the APL or the ASCII mode.

With the rocker switch in the SO-SI position and the terminal in the LCL mode, APL mode is selected by depressing the **N** key while the **CTRL** key is pressed and held, generating the ASCII control character SO (shift out). The ALTN CHAR (alternate character) indicator lights to signify that the terminal is in the APL mode. The terminal may be switched to ASCII mode by pressing and holding the **CTRL** key and pressing the **O** key, generating the ASCII control character SI (shift in) and extinguishing the ALTN CHAR indicator.

With the terminal in LINE mode, the APL/ASCII mode may be selected from the keyboard *only if local copy of transmitted data is configured.* Otherwise, the terminal will respond only to SO and SI characters received from the communications line. If fixed mode operation (always APL or always ASCII) is required, the desired mode is selected while the terminal is in LCL mode and the

SO-SI/LOCK switch is then placed in LOCK position. With the switch in LOCK position, the terminal will ignore SO and SI characters generated from the keyboard or received from the communications line.

6.6 NUMERIC KEYPAD

An 18-key numeric keypad is an available keyboard option for high volumn data entry applications. Since the numeric keypad must be physically mounted on the main keyboard printed-wiring circuit, this option is usually factory installed. Field upgrade requires exchange of keyboard assemblies.

Numeric keypad layout and symbolization are shown in Figure 6-3. The keypad is available on the standard ASCII and the APL option keyboards.

The ENTER key is user-programmable as described in Section 4. None of the keys on the numeric keypad have typomatic action. The mode control keys (i.e., SHIFT, UPPER CASE, and CTRL) of the keyboard have no effect on the numeric keypad functions.

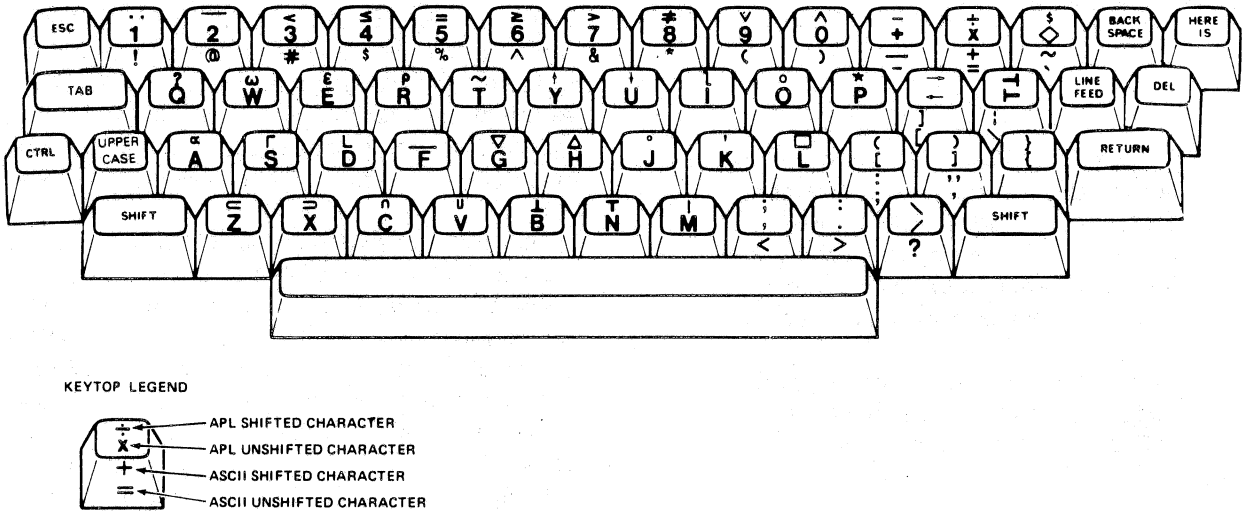


Figure 6-1. Optional APL Keyboard

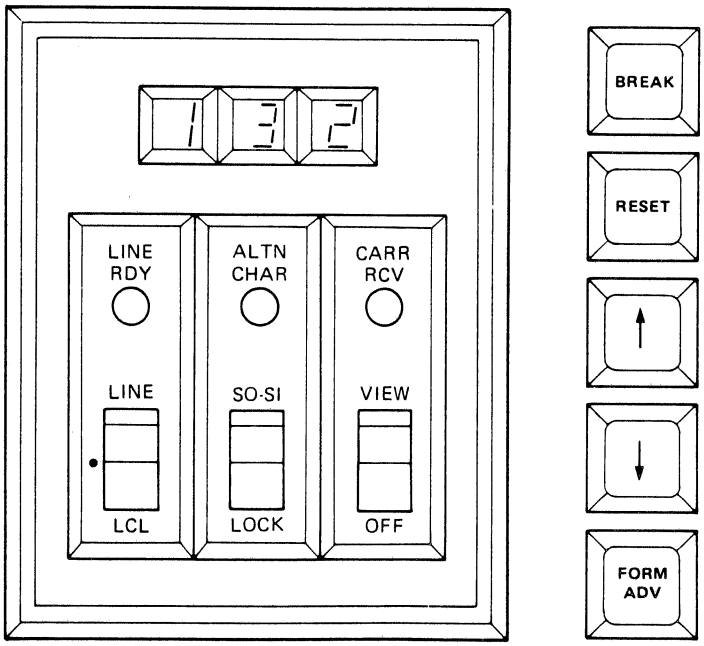


Figure 6-2. Control Panel, USASCII/APL Option

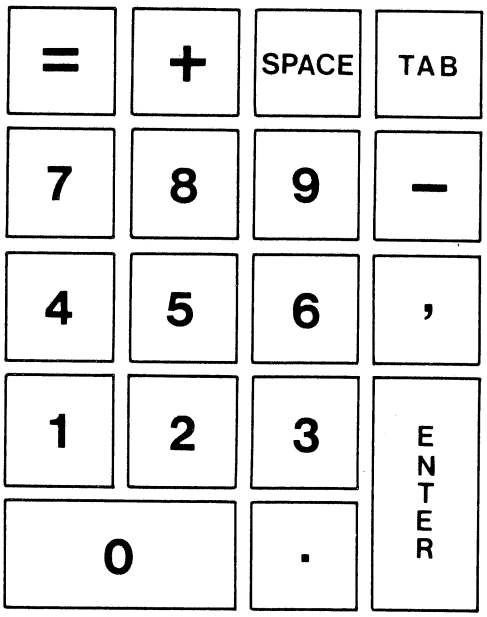


Figure 6-3. Numeric Keypad (Optional)

Part 2. System Manual

Section 7

Communications Interface

7.1 INTRODUCTION

This section includes detailed data for the communications interface of the Model 820 KSR. Information is also included for cabling (diagrams) and point-to-point signal interchange.

7.2 INTERFACE SIGNAL LEVELS

The Model 820 KSR interface signals levels conform to the EIA specification RS-232-C definitions. For simplicity, any discussion of the condition of interface control signals is in the ON and OFF terms defined by this specification.

When it is ON, a control line carries a positive voltage between +3 and +25 volts. When the line potential changes to a negative voltage between −3 and −25 volts, the line is considered to be OFF.

The digital data exchanged between the Model 820 KSR and an external data set consists of a series of logic ONE and ZERO signals. A logic ONE, called a MARK, is indicated by a negative voltage between −3 and −25 volts. A logic ZERO, called a SPACE, is indicated by a positive voltage between +3 and +25 volts.

In summary, a positive voltage on a control line is an ON condition; but a positive voltage on a data line represents a SPACE or logic ZERO. A negative voltage on a control line is an OFF condition, but on a data line a negative voltage represents a MARK or logic ONE.

7.3 ASYNCHRONOUS DATA FORMAT

The character structure of data transmitted or received by the terminal consists of one start bit, seven data bits, one parity bit, and one or two stop bits as shown in Figure 7-1.

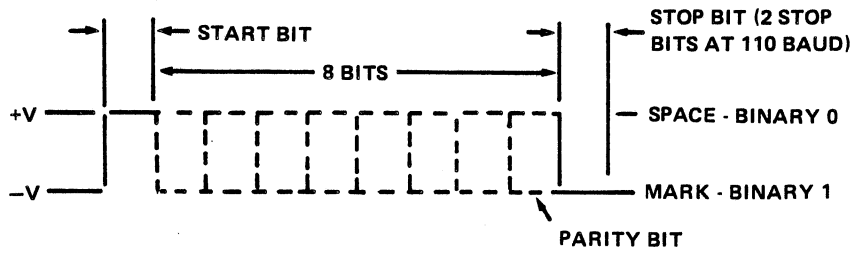


Figure 7-1. Asynchronous Data Format

7.4 INTERFACE SIGNALS

The standard interface between the Model 820 KSR and the communications line conforms to the electrical requirements of EIA Standard RS-232-C and C.C.I.T.T. Standard V24. Table 7-1 lists the interface signals, which are explained in the following paragraphs:

Table 7-1. Interface Signals

Connector Pin Number	EIA	C.C.I.T.T.	EIA Name
1	AA	101	Protective Ground
2	BA	103	Transmitted Data
3	BB	104	Received Data
4	CA	105	Request to Send
5	CB	106	Clear to Send
6	CC	107	Data Set Ready
7	AB	102	Signal Ground
8	CF	109	Received Line Signal Detector
11	SCA	120	Secondary Request to Send
12	SCF	122	Secondary Received Line Signal Detector
20	CD	108	Data Terminal Ready
22	CE	125	Ring Indicator
23	CH	111	Data Signal Rate Selector

1. *Protective Ground (AA)*
   This lead is connected to the terminal frame and earth ground conductor of the power cord.

2. *Signal Ground (AB)*
   This lead is tied to the DC ground of the terminal power supply. It establishes the common ground reference for all interface signals.

3. *Transmitted Data (BA)*
   This lead conveys signals from the terminal data transmitter output to the data set transmitter circuitry. It is held to a MARK condition when no data or break signals are being transmitted.

4. *Received Data (BB)*
   This lead conveys signals from the external data set receiver to the terminal data receiver input.

5. *Request to Send (CA)*
   This line is used by the terminal to control the transmitter carrier of the data set and is functional only when the terminal is configured for operation with half-duplex data sets such as the Bell 202 series. Request to Send is held on at all times when the terminal is configured for full-duplex operation and the control signal, Data Set Ready, is ON. For half duplex operation, Request to Send is controlled by the configured line turnaround characters and reverse channel options, as well as the paper-out response and buffer response option.

6. *Clear to Send (CB)*
   This line is turned ON by the data set to indicate to the terminal that the data set is ready to transmit. The terminal will not attempt to transfer data across the interface when Clear to Send is OFF.

7. *Data Set Ready (CC)*
   This line is turned ON by the data set to indicate that a connection has been established. The terminal will not attempt to receive or transmit data across the interface when Data Set Ready is OFF.

8. *Data Terminal Ready (CD)*
   This line is turned ON by the data terminal to indicate that it is ready to receive a call. Operation depends upon the position of the LINE/•/LCL switch, the configured "paper out" response, and the configured disconnect features.

9. *Ring Indicator (CE)*
   This line is turned ON by the data set to indicate that a ringing signal is being received on the communications line. This signal is not used by the Model 820 KSR.

10. *Received Line Signal Detector (CF)* also referred to as Data Carrier Detect
    This line is turned ON by the data set to indicate that it is receiving a valid carrier signal from a remote data set. The terminal will not accept data from the interface if this signal is OFF. This line (and no other) is regarded as ON when open (floating) to permit operation with data sets, such as the Bell 113 series, which do not provide circuit CF.

11. *Data Signal Rate Signal Selector (CH)*
This signal is used by some terminals to select the transmit and receive data rate when used with data sets equipped with this option. The Model 820 KSR holds this signal ON when configured for 1200 baud or higher and OFF for 600 baud or less.

12. *Secondary Request to Send (SCA)*
This line is held ON by the terminal to turn on the reverse channel transmitter of a Bell 202 compatible data set, equipped with reverse channel option. The transmitted reverse channel indicates that the terminal is ready to receive data. This signal is turned OFF at line turnaround or when a break signal is transmitted in response to the configured paper out or buffer response features. This output is also used as a terminal ready/busy indication in full-duplex mode for computer peripheral applications. (Configuration parameters 14 and 15).

13. *Secondary Receive Line Signal Detector (SCF)* also referred to as Secondary Data Carrier Detect
This signal has a dual function, depending on the external data set. It is held ON by 202 series data sets to indicate receipt of a valid reverse channel carrier from a remote data set. When the terminal is configured for the reverse channel feature, it will not transmit data until reverse channel is received and will treat any loss of reverse channel for 112 ms or longer as a break signal. Bell 212 compatible data sets use this signal as a baud rate indicator, holding the signal ON for 1200 baud operation and OFF for 300 baud. The terminal may be configured to adjust transmit and receive data rates automatically in response to this signal.

7.5 COMMUNICATIONS INTERFACE CONNECTOR AND CABLE

The terminal is equipped with a receptacle equivalent to a Cinch or Cannon DB-19604-433 with threaded retaining spacers. The mating cable should be terminated in a Cinch or Cannon DB-19604-432 plug mounted in a Cinch DB 51226-1 hood or equivalent. A 6 foot cable, suitable for connection to Bell 202 and 212 series and most other data sets (TI part no. 2207634-0001) is available as an option with the terminal. Other mating data set cables and cable extensions are available as accessories. The following sections will provide a detailed description of cable options available with the Model 820 KSR.

Satisfactory operation of the terminal can not be guaranteed when the length of the signal cable exceeds the EIA RS-232C recommendation of 15.25 meters (50 feet). With proper design of the cable, drivers, receivers and terminating devices external to the terminal, satisfactory operation at distances up to 305 meters (1000 feet) is usually possible. Beyond this distance the current loop interface option or limited distance modems should be considered.

When using long signal cables it may be necessary to direct couple logic and safety grounds, by connecting #221 to E223 on the electronics board inside the terminal, to obtain satisfactory operation. The necessity for this is a function of the system installation and must be determined experimentally by a qualified installer.

WARNING

Long signal cables pose a possible safety hazard. Such cables must be adequately protected against lightning strikes or accidental shorting to power conductors. Routing of the cables through grounded metallic conduit, with no power conductors in the same conduit, or installation of suitable protective devices at each end of the cable are possible methods of protecting against operator injury or equipment damage. These precautions are particularly important if any portion of the signal cable is installed outdoors.

7.6 CURRENT LOOP COMMUNICATIONS INTERFACE OPTION

The current loop interface option converts the EIA RS-232-C levels of the standard communications line interface to a 20 mA neutral current loop. The

interface consists of separate transmit and receive circuits, electrically isolated from each other and from signal and chassis ground. The receiver and transmitter may be used separately in a four-wire system or externally connected in series to form a two-wire system. Use of two-wire at data rates above 300 baud with the buffer-full/buffer-ready response enabled is not recommended. The BUSY signal (DC3) at buffer full is transmitted asynchronously with respect to received data, and may cause parity errors and incomplete or missing characters.

The DC current loop interface option uses a nine-pin connector which is installed directly above the existing communications connector. The standard 25-pin connector must have the shorting plug (provided with option) installed for the current loop option to function.

Connect logic ground to safety ground by jumpering E221 to E223 on the terminal electronics board when using the current loop option.

WARNING

The safety precautions for long cables, described previously in paragraph 7.5, also apply to the current loop interface.

The DC current loop cable pin assignments (TI part no. 994403) are shown in Table 7-12. Four-wire and two-wire current loop connections are shown in Figure 7-2. The electrical specifications for the current loop option are:

- Receiver

  Nominal Current: 20 mA dc
  Threshold (Decision) Current: 10 + 1 – 6 mA
  Maximum Voltage Drop: 3.0 Vdc at 20 mA
  Maximum Current Rating: 100 mA dc Continuous
  Maximum Common Mode Voltage: 45 Vdc, continuous or switched at the configured transmission rate, will not cause errors in received data

- Transmitter

  Nominal Current: 20 mA dc
  Maximum Current Capability: 100 mA dc
  Maximum Voltage Drop When On (Marking): 1.0 Vdc, 20 mA
  Maximum Leakage Current When Off (Spacing): 0.5 mA, 45 Vdc
  Maximum Common Mode Voltage: Same as Receiver

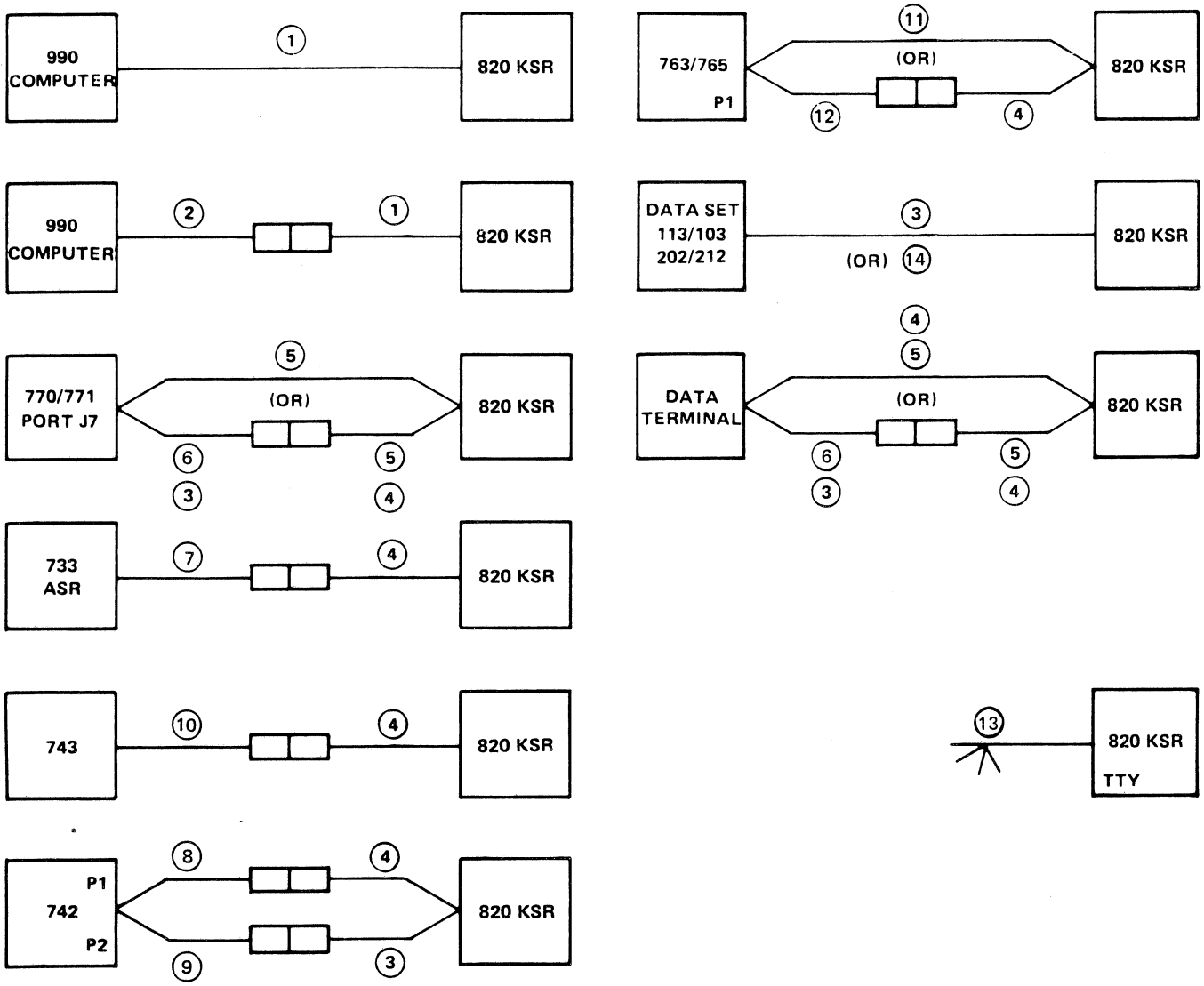
7.7 ACCESSORY CABLES

Table 7-2 specifies part numbers and description of the accessory cables available for specific equipment interface. Table 7-3 through 7-12 provide additional data on these cables.

7.8 RECOMMENDED DATA SET OPTIONS

Table 7-13 contains the recommended settings of the 202, 212, and 103J modems for use with the Model 820 Terminal.

Table 7-2. Summary of Cables



Item	Part Number	Description	820 KSR Connector Type	Device Connector Type	Length	
					Meters	Feet
1	2262093-0001	990 TTY/EIA To 820 Cable	25 Pin Male	25 Pin Male	9.1	30
2	2262094-0001	990 Extension - 820 Cable	25 Pin Male	25 Pin Female	1.8	6
3	993205-0001	113A/103/202/212 Data Set	25 Pin Male	25 Pin Male	1.8	6
4	993210-0001	Data Terminal Cable	25 Pin Male	25 Pin Female	1.8	6
5	993239-0001	770 Data Terminal Cable	25 Pin Male	25 Pin Male	1.8	6
6	993211-0001	EIA Extension Cable (25 wires)	25 Pin Male	25 Pin Female	1.8	6
7	959372-0002	733 EIA Cable	25 Pin Male	25 Pin Edge	1.8	6
8	969626-0001	742 EIA Cable	25 Pin Male	10 Pin Dual Edge Connector		
9	973265-0001	742 Auxiliary Cable	25 Pin Female	15 Pin Dual Edge Connector	1.8 3.7	6 12
10	983848-0001	743 EIA Cable	25 Pin Male	15 Pin Female	1.8	6
11	2263350-0001	763/765 Data Terminal Cable	25 Pin Male	15 Pin Female	1.8	6
12	2200051-0001	763/765 Data Set Cable	25 Pin Male	15 Pin Female	1.8	6
13	994403-0001	TTY Current Loop Cable	—	—	1.8	6
*14	2207634-0001	Asynch/Synch EIA Cable	25 Pin Male	25 Pin Male	1.8	6

*This cable is recommended for use with the Bell 212 Modem that is configured for both 300 and 1200 baud operations.

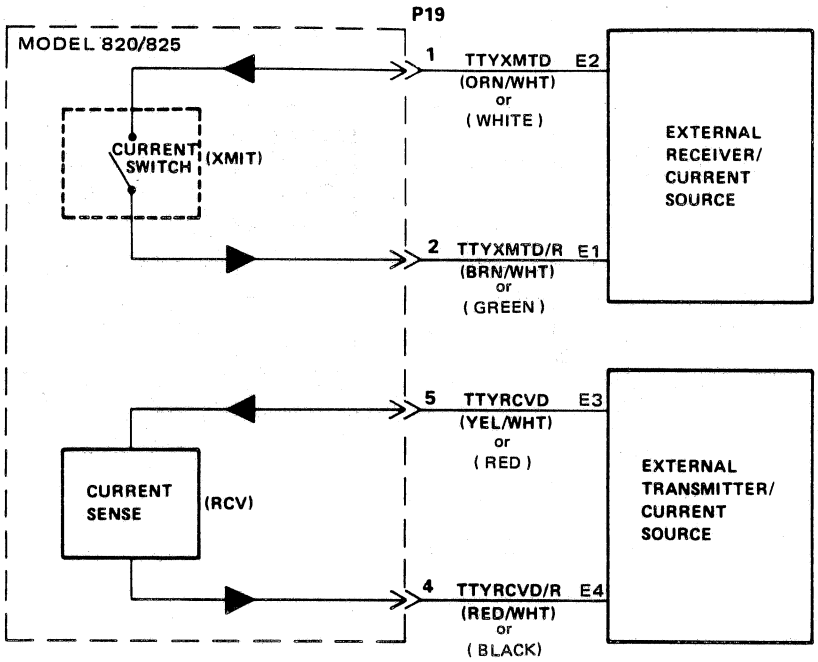


FIGURE 7A. FOUR-WIRE CONNECTION

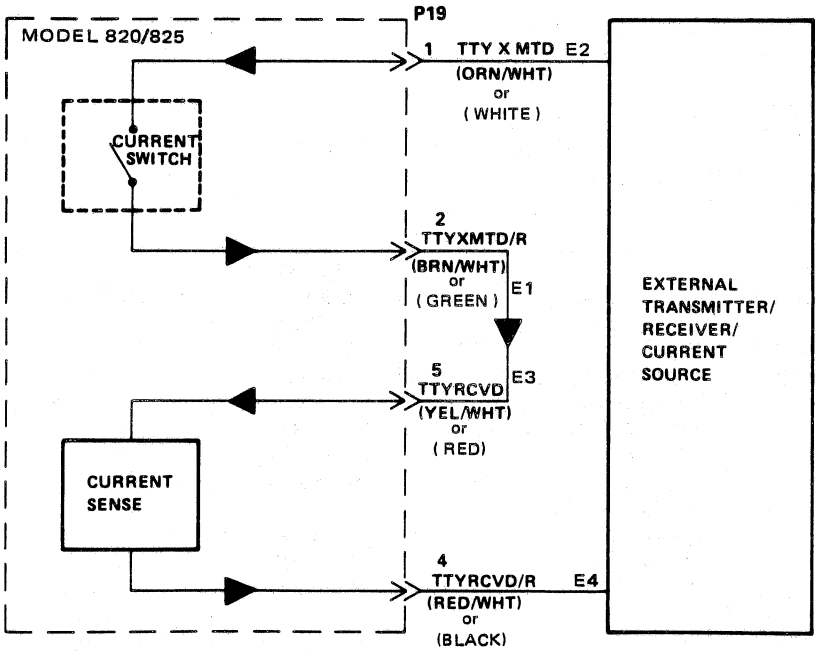


FIGURE 7B. TWO-WIRE CONNECTION

Figure 7-2. Model 820/825 Current Loop Interface Configurations

Table 7-3. 113A/103, 202/212 Data Set Cable (TI Part No. 993205-0001)

820 Pin P6-P7 (Male)	Data Set Pin (Male)	RS-232-C Circuit	Function
1	1	AA	Protective Ground
2	2	BA	Transmitted Data
3	3	BB	Received Data
4	4	CA	Request to Send
5	5	CB	Clear to Send
6	6	CC	Data Set Ready
7	7	AB	Signal Ground
8	8	CF	Received Line Signal Detector
11	11	SCA	Secondary Request to Send (Reverse Channel Transmit)
12	12	SCF	Secondary Received Line Signal Detector (Reverse Channel Receive)
20	20	CD	Data Terminal Ready
22	22	CE	Ring Indicator

Table 7-4. Data Terminal Cable (TI Part No. 0993210-0001)

Reference:	Pin	RS-232-C Circuit	Function
(Either End)	1	AA	Protective Ground
	2	BA	Transmitted Data
	3	BB	Received Data
	4	CA	Request to Send
	5	CB	Clear to Send
	6	CC	Data Set Ready
	7	AB	Signal Ground
	8	CF	Data Carrier Detect
	11	SCA	Reverse Channel Transmit
	12	SCF	Reverse Channel Receive
	15	DB	Tranmsission Signal Element Timing
	17	DD	Receive Signal Element Timing
	20	CD	Data Terminal Ready
	24	AUXLIO	Auxiliary Input/Output Control

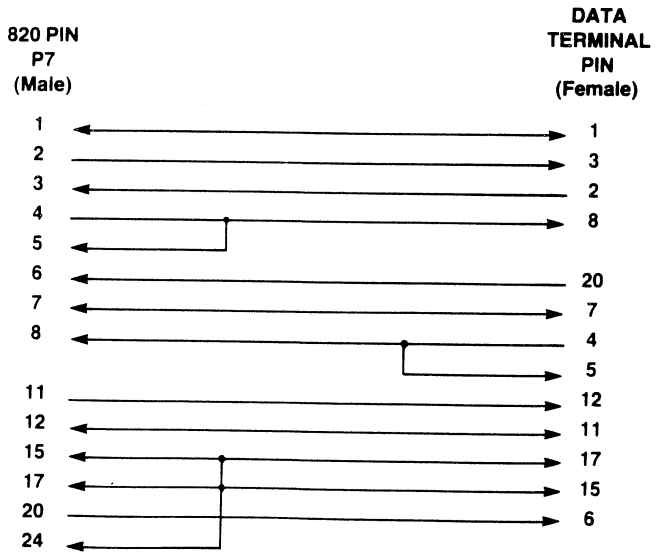


Table 7-5. 770 Data Terminal Cable (TI Part No. 993239-0001)

Reference:	Pin	RS-232-C Circuit	Function
(Either End)	1	AA	Protective Ground
	2	BA	Transmitted Data
	3	BB	Received Data
	4	CA	Request to Send
	5	CB	Clear to Send
	6	CC	Data Set Ready
	7	AB	Signal Ground
	8	CF	Data Carrier Detect
	11	SCA	Reverse Channel Transmit
	12	SCF	Reverse Channel Receive
	15	DB	Tranmsission Signal Element Timing
	17	DD	Receive Signal Element Timing
	20	CD	Data Terminal Ready
	24	AUXLIO	Auxiliary Input/Output Control

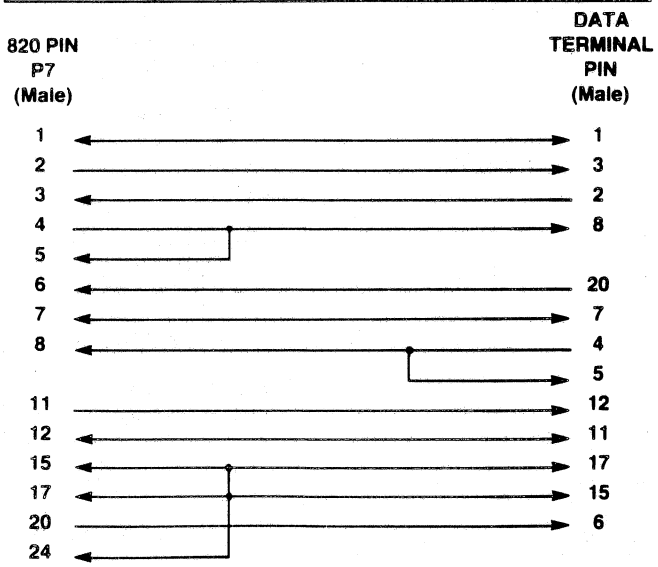


Table 7-6. 733 ASR Terminal Cable, 1200 Baud (TI Part No. 959372-0002)

820 Pin P13	ASR Pin P1	RS-232-C Circuit	Function
1	A	AA	Protective Ground
2	H	BA	Transmitted Data
3	10	BB	Received Data
4	C	CA	Request to Send
5	8	CB	Clear to Send
6	9	CC	Data Set Ready
7	7	AB	Signal Ground
8	K	CF	Received Line Signal Detector
20	6	CD	Data Terminal Ready

Table 7-7. 742 Terminal Cable (TI Part No. 969626-0001)

820 Pin P13	742 P1	RS-232-C Circuit	Function
1	A	AA	Protective Ground
2	H	BA	Transmitted Data
3	10	BB	Received Data
4	F	CA	Request to Send
5	8	CB	Clear to Send
6	9	CC	Data Set Ready
7	7	AB	Signal Ground
8	K	CF	Received Line Signal Detector
11	5	SCA	Secondary Request to Send
12	4	SCF	Secondary Received Line Signal Detector
20	6	CD	Data Terminal Ready
22	J	CE	Ring Indicator

Table 7-8. 742 Auxiliary Cable (TI Part No. 973265-0001)

820 Pin P13	742 Pin P2	RS-232-C Circuit	Function
3	11	BB	Received Data
4		CA	Request to Send
5		CB	Clear to Send
6		CC	Data Set Ready
7	1	AB	Signal Ground
8		CF	Received Line Signal Detector
11	12	SCA	Secondary Request to Send
12	13	SCF	Secondary Received Line Signal Detector
20		CD	Data Terminal Ready

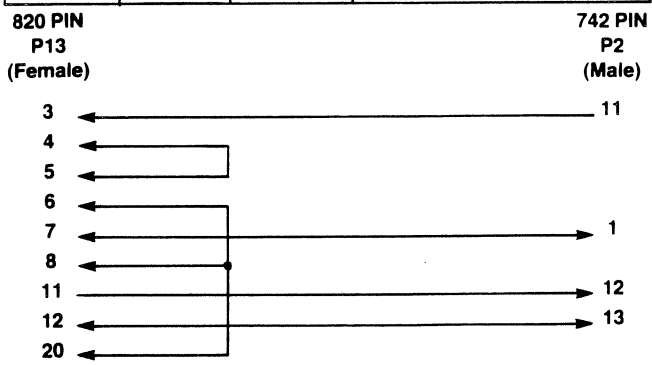


Table 7-9. 743 Terminal Cable (TI Part No. 983848-0001)

820 Pin P2	743 Pin P1	RS-232-C Circuit	Function
1	9	AA	Protective Ground
2	13	BA	Transmitted Data
3	12	BB	Received Data
4	10	CA	Request to Send
7	1	AB	Signal Ground
8	11	CF	Received Line Signal Detector
20	15	CD	Data Terminal Ready

Table 7-10. 763/765 Data Terminal Cable Pin Assignments (TI Part No. 2263350-0001)

763/765 Terminal Connector (P1)	820 Terminal Connector	Function	763/765 Circuit	
			EIA	C.C.I.T.T.
-1	-1	PG	AA	101
-2	-11	CTS	CB	106
-3	-2	RCV	BB	104
-4	-4 and -5	DCD	CF	109
-8	-6	DTR	CD	108.2
-9	-20 and -8	DSR/CCT	CC	107
-14	-3	XMT	BA	103
-15	-7	SG	AB	102

Table 7-11. TTY Current Loop Interface Cable P/N 994403-0001

820 Pin	Retainer Clip	Function
1	E2	TTY Transmitted Data Return
2	E1	TTY Transmitted Data
4	E4	TTY Received Data Return
5	E3	TTY Received Data

Table 7-12. Asynch/Synch EIA Cable* (TI Part No. 2207634-0001)

820 Pin (Male)	Data Set Pin (Male)	RS-232-C Circuit	Function
1	1	AA	Protective Ground
2	2	BA	Transmitted Data
3	3	BB	Received Data
4	4	CA	Request to Send
5	5	CB	Clear to Send
6	6	CC	Data Set Ready
7	7	AB	Signal Ground
8	8	CF	Received Line Signal Detector
11	11	SCA	Secondary Request to Send
12	12	SCF	Secondary Received Line Signal Detector
15	15	DB	Transmission Signal Element Timing
17	17	DD	Receiver Signal Element Timing
20	20	CD	Data Terminal Ready
22	22	CE	Ring Indicator
23	23	CH	Data Signal Rate Selector (DTE)

*NOTE: Recommended for use with the Bell 212 Data Sets equipped with the Speed Control Option.

Table 7-13. Recommended Data Set Options

103J

Modem Option	Recommended Setting
Receive space disconnect	Either — T or U
Send space disconnect	Either — V or Y
Loss of carrier disconnect	Either — S or R
CC Indication	Early — ZD
CB and CF indications	Common — A
CC indication for analog loop	On — ZF
Automatic answer	Yes — ZH
Failsafe state of CN circuit	Off — J
Common ringer	Either — ZB or ZA
Common grounds	Yes — Q
Tip ring make busy	No — E

202S

Modem Option	Recommended Setting
Soft turnoff and squelch intervals	Soft turnoff = 24 ms (R) Squelch = 156 ms (R)
Fast carrier detect	Out — N
Clear-to-send interval	180 ms — G
Auto answer	In — B
Local copy primary channel	Out — ZB
Condition of CC (DSR) in analog loop	On — YI
Transmit only	Out — YH
Echo suppression enable	Out — YR
Carrier control turnaround	In — YS
Early CC (DSR) indication	Out — YV
Reverse channel	Either — ZC or ZD
Local copy on reverse channel	Out — ZF
Grounding option	Signal ground to frame — ZG

212A

Modem Option	Recommended Setting
Tip ring make busy	Out — E
CC indication for analog loop	On — ZF
CN circuit	Out — YF
Transmitter timing	Internal — YC
1200 baud operation	Async/start-stop — YG
Character length	10-bit — YS
Receiver respond to digital loop	Off — YL
Loss of carrier disconnect	In — S
Receive space disconnect	In — V
CB and CF indications	Common — A
Send space disconnect	In — T
Automatic answer	In — ZH
Answer mode indication, CE	Off — W
Speed mode	Dual — YP
Interface speed indication, CI	In — YQ
Signal ground to frame connection	In — A
Speed Control*	Interface-XJ

*NOTE: Speed Control Option for 300/1200 BPS surface.

Section 8

Model 820 KSR Communications Systems Operating Characteristics

8.1 INTRODUCTION

This section provides a detailed description of the line communications characteristics of the Model 820 KSR and is intended for the systems engineer, programmer, or analyst.

8.2 COMMUNICATIONS MODES

The Model 820 KSR has three communications modes which may be selected from the keyboard for use with external data sets (modems):

- Half duplex (code 11)
- Half duplex with reverse channel (code 12)
- Full duplex (code 13)

Or, one of three non-modem communications modes also may be selected from the keyboard.

- Full duplex with reverse channel transmit (SCA) ON for ready (code 14).
- Full duplex with reverse channel transmit (SCA) OFF for ready (code 15).
- Enable current loop option (same as code 14 otherwise; code 16).

Local copy of transmitted data may be enabled from the keyboard for all communications modes, including full duplex.

8.2.1 Full-Duplex Data Set

The full-duplex data set communications mode provides independent receive and transmit circuits, thus allowing simultaneous bidirectional communications with an external data set. This communications mode supports the communications timing constraints required by many data sets and allows the use of the automatic disconnect and auto-triggered answerback features of the Model 820 KSR.

If local copy of transmitted data (code 82) is enabled in this communications mode, and the Model 820 transmits any characters while simultaneously receiving data from the communications line, the transmitted and received data will be interleaved on the printed page.

8.2.2 Half Duplex

Half-duplex mode on the Model 820 KSR refers to the use of communications channel, such as that provided by a Bell 202-series data set, which permits data communications in only one direction at a time. Half-duplex operation in the Model 820 KSR can include the use of a protocol which uses line turnaround (LTA) characters for line control. Receipt of a turnaround character switches the Model 820 KSR from the receive to the transmit mode. Transmission of a line turnaround character, as part of a transmit sequence, switches the Model 820 KSR back to the receive mode.

A configuration parameter (configuration code 66) can be enabled for use with this communications mode which will cause the terminal to operate without the use of line turnaround characters. In this type of half-duplex operation the terminal will switch to the transmit mode only when the terminal has a transmit sequence ready to send and the communications line control signal Data Carrier Detect is OFF, indicating that the channel is

free to use. The terminal will automatically return to a ready to receive state after the transmit sequence has been completed.

8.2.3 Half Duplex with Reverse Channel

The Model 820 KSR provides additional control in the half-duplex mode by utilizing the reverse channel features of a type-202 data set. The reverse channel transmit and receive circuits are used for circuit assurance and for printer busy.

The use of line turnaround characters may also be inhibited for this half-duplex mode.

8.2.4 Direct Wire Full Duplex

These three communications modes provide independent transmit and receive circuits but do not support the communications timing constraints often required by data sets. They also differ from the data set modes in that:

- The communications interface control line Secondary Request-to-Send (SCA—Reverse Channel Transmit) is used as a terminal ready-busy indicator.
- Operation of the auto-triggered answerback memory and automatic disconnect features are dependent on the revision level of the firmware (ROMS) installed in the terminal. To determine the ROM set installed in your terminal, refer to paragraph 10.3.2.4, ROM Identification Report.

For all ROM sets, auto-disconnect parameters 61, 62 and 63 are invalid.

For ROM sets 03B/04B, 05B/06B, and 07B/08B, auto-disconnect parameter 64 and auto-triggered ABM parameter 71 are also invalid. For ROM set 09B/10B and higher-numbered revisions, these two parameters are functional.

Code 16 will also enable the optional current loop interface if installed.

If code 14 is selected, SCA is ON when ready; for code 15, SCA is OFF when ready. These parameters simplify the use of the Model 820 KSR in computer hardwired applications and should not be selected for terminals connected to external data sets.

8.3 USING EXTERNAL DATA SETS

The three modes of data set communications supported in the Model 820 KSR are (a) full-duplex, (2) half duplex, and (3) half-duplex with reverse channel. The sequence of events that occurs between the Model 820 KSR and an external data set for each mode of communications is described in the following paragraphs. For simplicity the condition of the control lines is discussed only in the ON and OFF terms defined by EIA Specification RS-232-C. The EIA circuit designation for each control signal is listed in Table 7-1.

Since a great variety of data sets are available on the commercial market, it is not feasible to discuss the individual requirements of each data set. Therefore, the scope of the following topics is limited to those signals received from an external data set and the signals provided by the Model 820 KSR terminal to a data set.

Terminal operation is described below with the following Model 820 KSR features disabled.

- Answerback memory (ABM) auto-trigger
- Automatic disconnect
- Fail-safe disconnect
- No activity disconnect

Operation with these features enabled is discussed under separate headings later in this section.

8.3.1 Full-Duplex Operation

The full-duplex data set mode provides independent receive and transmit circuits which permit simultaneous bidirectional communication to occur.

The terminal operator initiates communications mode operation by switching the LINE/•/LCL switch to the LINE position, which switches the *Data Terminal Ready* (DTR) Line ON. The DTR Line must be ON before the external data set may switch the *Data Set Ready* (DSR) line ON. When ready to exchange data with a remote device, the external data set will switch the DSR line ON. If the terminal does not detect DSR, it will wait (the keyboard is disabled while the terminal is waiting) until DSR switches ON.

The Model 820 KSR terminal switches the request to send (RTS) line ON as soon as it detects that the DSR line has been switched ON by the external data set. At the same time the Model 820 KSR causes the LINE RDY indicator on the operator control panel to start flashing.

To begin the actual data exchange, two signals are now required: *Data Carrier Detect* (also called *Received Line Signal Detector*) and *Clear To Send*. The receive circuit requires the *Data Carrier Detect* (DCD) signal to be ON to begin operation, and the transmit circuit requires *Clear To Send* (CTS) line to be ON. Although the receive and transmit sequence of events occur simultaneously, each sequence is described separately.

The Model 820 KSR terminal must receive a *clear to send* (CTS) signal from the external data set before it can transmit data. After CTS switches ON, the LINE RDY indicator on the operator control panel will stop flashing and glow steadily. The terminal then can transmit data entered from the keyboard to the external data set via the *Transmitted Data* (TD) line. Each character then is transmitted as it enters the data set and is modulated for transmission over the telephone line. Transmission of data may continue as long as characters are entered from the keyboard until loss of either the CTS or DSR signals occurs.

If the CTS line goes OFF, the LINE RDY indicator will begin flashing and any character being transmitted will be completed, but no new characters will be transmitted until CTS switches back ON. Any characters entered via the keyboard while CTS is OFF are stored in a 32-character first-in-first-out (FIFO) buffer. The characters in the FIFO buffer will be transmitted when CTS switches back ON. After 32 characters are entered into the buffer with CTS OFF, an alarm will sound when entry of the 33rd character is attempted. An error code 25 will be displayed on the terminal status display (TSD) of the operator control panel, and the last character entered will be lost.

If DSR goes OFF, indicating that the call has been disconnected, the terminal LINE RDY indicator will extinguish, and any characters remaining in the transmit FIFO buffer will be lost. The Model 820 KSR will respond to the loss of DSR by switching RTS OFF. DTR will remain ON until the LINE/•/LCL switch is returned to the LCL position.

If the terminal LINE/•/LCL switch is switched to the • (STANDBY) position from the LINE position, the DTR line will remain ON but data will not be accepted or transmitted. The terminal does not provide any indication to the external data set that it is in STANDBY.

The *Data Carrier Detect* (DCD) line from the external data set must be ON for the terminal to receive data on the *Received Data* (RD) line. When DCD is detected by the terminal, the CARR RCV indicator on the operator control panel will light. If the DCD line switches OFF, the CARR RCV indicator will extinguish and the terminal will stop receiving data until DCD is ON again.

Because some data sets do not have a DCD output (e.g., 113-type data sets) the Model 820 KSR determines the presence of DCD by checking for an OFF (negative voltage) condition. If the DCD input to the Model 820 KSR does not have a negative potential or there is no input connected to it, the line is assumed to be ON and the CARR RCV indicator will light. When the terminal is used with 113-type data sets, the CARR RCV indicator is always lit.

8.3.2 Half Duplex Without Reverse Channel Operation

When the Model 820 KSR is operating in the half-duplex mode, communications can take place in only one direction at a time. When the Model 820 KSR is in receive mode, the remote unit must be in the transmit mode. Likewise, when the Model 820 KSR is in the transmit mode, the remote unit must be in the receive mode. The one-way nature of this type of communications channel requires that both units of the communications link be in agreement on which unit should be in receive mode and which unit should be in transmit mode. This may be accomplished by having the transmitting unit control the line.

Line control for this type of half-duplex system is usually accomplished by the use of a line turnaround character. When the Model 820 KSR receives a line turnaround character, it switches from the receive mode to the transmit mode and

when the Model 820 KSR transmits a line turnaround character, it switches from the transmit to receive mode and is ready to receive data. When the remote unit receives the line turnaround character, it switches from receive mode to transmit mode. The transmitting unit must provide a turnaround character upon completion of a transmission. The receiving unit has no control of the communications line until it receives a line turnaround character and becomes a transmitting unit.

The Model 820 KSR provides for selecting any three of the 128 ASCII characters for use as turnaround characters. In addition, the receipt of the character ENQ is treated as a line turnaround character is an ABM is programmed; the transmission of the character ENQ will always be treated as a line turnaround character.

The operator initiates communications mode operation by setting the terminal LINE/•/LCL switch to the LINE position. This causes the *Data Terminal Ready* (DTR) line to switch ON informing the external data set that the Model 820 KSR terminal is ready to exchange data. When the data set switches the *Data Carrier Detect* (DCD) line on, the terminal must check its keyboard to determine if it should switch to the receive mode. If a keyboard entry is made prior to DCD becoming valid, or if the auto-triggered ABM feature is used, the terminal will raise its *Request To Send* (RTS) line and enter the transmit mode as soon as it receives valid *Clear To Send* (CTS) signal, and remain there until an LTA character is transmitted.

If the external data set switches the DCD line ON prior to a valid keyboard entry or auto-triggering of the ABM message, indicating a carrier present on the communications line, the Model 820 KSR terminal will switch to the receive mode, the CARR RCV indicator will illuminate, and the LINE RDY indicator will remain lit.

The terminal will remain in the receive mode until it receives a turnaround character on the *Received Data* line, or the call is disconnected. It is not the responsibility of the external data set to detect the line turnaround character. The data set will send the characters on the data line. The Model 820 KSR terminal is responsible for recognizing the turnaround character and acting upon it.

NOTE

If the 820 KSR is receiving and DCD is lost but no LTA is received, the opeator can seize the line by momentarily depressing the BREAK key; this forces the 820 KSR into the transmit mode.

When the Model 820 KSR terminal detects a line turnaround character, the receive circuits are disabled, the CARR RCV indicator extinguishes, and when the DCD line is switched OFF, the *Request To Send* (RTS) line is switched ON. The LINE RDY indicator on the operator control panel will begin to flash until the external data set switches the *Clear To Send* (CTS) line ON. After the CTS line is switched ON, the LINE RDY indicator will glow steadily.

The Model 820 KSR will go to the transmit mode when it receives a line turnaround character and will remain in the transmit mode until a line turnaround character is transmitted.

8.3.3 Half Duplex with Reverse Channel Operation

Half-duplex with reverse channel operation is similar to half-duplex; but a low-frequency secondary channel, commonly referred to as the *reverse channel* is added. In a line turnaround character half-duplex system the receiving unit has no control over the communications channel. In a half duplex with reverse channel system, the receiving unit has limited control of the communications channel by use of the reverse channel control signal.

Additional control lines are used in half duplex with reverse channel communications. The two reverse channels are *Secondary Received Line Signal Detector* (circuit SCF) and *Secondary Request To Send* (circuit SCA). Because there are no standardized short forms of the reverse channel names, the EIA circuit names *SCF* and *SCA* are used in the following discussion.

When the Model 820 KSR terminal switches the *reverse channel SCA* line ON, it is received by the remote unit as a *reverse channel SCF* signal. Likewise, when the remote unit switches the *reverse channel SCA* line ON, it is received by the

Model 820 KSR terminal as a *reverse channel SCF* signal.

No officially recognized standard exists to specify use of the reverse channel. The Model 820 KSR terminal sequence of events for reverse channel operation is described below.

Initiation of half-duplex data communications with reverse channel is identical to the half-duplex described in paragraph 8.3.2. The Model 820 KSR terminal sets the *Data Terminal Ready* (DTR) line to ON and waits for a *Data Set Ready* (DSR) signal from the external set. When the Model 820 KSR detects the DSR from the data set, the Model 820 KSR enters an idle state with SCA on, until the necessary parameters are detected to enable the Model 820 KSR to switch into either the *transmit* or *receive* mode.

If the external data switches the *Data Carrier Detect* (DCD) line ON, while the Model 820 KSR is in the idle state, the Model 820 KSR will switch to the receive mode, the CARR RCV light will illuminate, and the SCA line will remain ON. The Model 820 KSR will remain in the receive mode until it receives a line turnaround character.

Upon entering transmit mode, initially to transmit a keyboard-entered character or an auto-triggered ABM, or after a line turnaround, the terminal waits for the SCF *(Secondary Received Line Signal Detector)* line to switch ON before sending a character. If the SCF line does not switch within 8 seconds after the *Request To Send* (RTS) line is switched ON, then the terminal switches OFF RTS and switches ON SCA, thus returning to the receive mode. If SCF switches OFF while the terminal is in the transmit mode, the terminal holds the Transmit Data (TD) line to a MARK condition and initiates a 112-millisecond timeout. During this timeout and while SCF is OFF, any characters to be transmitted will be placed in the transmit FIFO buffer. If SCF switches ON before the timeout completes, then the terminal remains in transmit mode, sending any characters that may remain to complete a transmit sequence. If SCF remains OFF for the duration of the timeout, then the terminal reverts to the receive mode by switching OFF RTS and then switching ON the SCA line. Any characters remaining to be transmitted at this time are discarded.

8.3.4 Half Duplex Operation without Line Turnaround Characters

The Model 820 KSR will operate with both types of half-duplex communications channels without using line turnaround characters for line control. This type of half-duplex operation is selected by enabling configuration code 66 in conjunction with one of the half-duplex communications mode configuration codes (11 or 12). The half duplex without line turnaround character type of operation is the same as the standard half-duplex modes (with line turnaround characters) with the exception that the turnaround of the communications line and any transition from the receive or transmit mode will be to an idle state.

The Model 820 KSR holds the *Data Terminal Ready* (DTR) line ON when it is in the idle state. If the Model 820 KSR is in the half-duplex with reverse channel mode, *Secondary Request To Send* (SCA) will also be held ON when the terminal is in the idle state. The transitions among the idle, receive, and transmit states will take place as follows. The transition from idle to receive will occur when *Data Carrier Detect* (DCD) is switched ON and the transition from receive to idle will occur when DCD is switched OFF. The transition from idle (note that DCD must be OFF to be in the idle state) to transmit will occur when there is a character sequence ready to be transmitted and the transition from transmit to idle will occur when the transmit sequence is completed. For half duplex with reverse channel, the transition from transmit to idle will also occur if the *Secondary Received Line Signal Detector* (SCF) line does not switch ON within 8 seconds or if SCF is lost (switched OFF after being ON) for 112 milliseconds.

NOTE

The fail-safe disconnect loss of carrier time-out will be disabled when the terminal is set for half duplex without line turnaround character operation. The operator error status code for failure to program line turnaround characters in half duplex (Code 10), will also be disabled.

A transition from transmit to idle modes may be

effected by depressing the CTRL, SHIFT, and RETURN keys simultaneously. This operation will cause the RTS line to be forced low (and the SCA line to be forced high, if in half duplex with reverse channel) if code 66 is enabled. If parameter 66 is not enabled, this action will cause the first programmed LTA character to be transmitted. Either case assures that the Model 820 KSR will now be ready to receive data and the connected equipment has been notified of this new status.

8.4 ANSWERBACK MEMORY FUNCTIONS

The Model 820 KSR provides as a standard feature an answerback memory (ABM) which may be programmed with a message of up to 21 characters. If a message is programmed, it will be transmitted when the ASCII character ENQ is received or when the HERE IS key is depressed. The terminal may also be configured to transmit the ABM automatically when a call is answered or originated (ABM auto-trigger feature). The ABM auto-trigger feature does not function for full duplex modes 14, 15 or 16 with ROM set 03B/04B, 05B/06B or 07B/08B installed.

The standard ABM is stored in the non-volatile configuration memory and is operator-programmable. For applications where field programmability is not desired, non-alterable PROM storage of the ABM is available as a hardware option.

The ABM auto-trigger feature causes the answerback message to be transmitted automatically at the following times, according to the communications mode:

1. Full duplex—1.28 seconds after both *Data Set Ready* (DSR) and *Clear To Send* (CTS) have turned ON. *Request To Send* is switched ON when DSR switches ON. CTS ordinarily turns ON simultaneously with the *Data Carrier Detect* line.

2. Half duplex—Similar to full duplex except that the *Data Carrier Detect* line (DCD) is tested when *Data Set Ready* turns ON. If DCD is OFF for 220 milliseconds, indicating that no carrier is being received, *Request To Send* (RTS) is switched ON and the answerback is transmitted 1.28 seconds after *Clear To Send* switches ON. If DCD is ON within 220 milliseconds after DSR switches ON, the Model 820 remains in receive mode until the first line turnaround. The answerback is then transmitted at the same 1.28 second delay after CTS switches ON.

3. Half duplex with reverse channel—Identical to half duplex with the exception that reverse channel must be received (SCF ON) before the answerback is transmitted.

NOTE

In both half duplex and half duplex with reverse channel operation with line turnaround (LTA) characters, the answerback must be programmed to include an LTA as the last character of the message if the Model 820 KSR is expected to revert to receive mode after the ABM is transmitted. In half-duplex operation without line turnaround characters (parameter 66 enabled), the terminal will automatically (without any LTA character) revert to a ready to receive (idle) state when the ABM is transmitted.

8.5 AUTOMATIC DISCONNECT

The Model 820 KSR provides for recognition of the ASCII control character EOT or the two character sequence, DLE followed immediately by EOT, as disconnect characters. Recognition of EOT and/or DLE EOT may be enabled or disabled from the keypad as part of the terminal configuration procedure. This feature is functional only in conjunction with communications mode parameters 11, 12 and 13. If a disconnect character is enabled, its reception initiates the following sequence:

a. Recognition of additional data from the communications line and transmission to the line are inhibited.

b. Data Terminal Ready (DTR) is pulsed OFF until Data Set Ready (DSR) has been OFF for 3 seconds.

c. Data transmission and recognition are reenabled when the next call is answered or originated. If no disconnect character is enabled the line is monitored for data until either Data Carrier Detect (DCD) or DSR switches OFF. Disconnect must be effected manually, by the data set's internal disconnect options, or by the failsafe disconnect feature, if so configured.

8.6 FAIL-SAFE DISCONNECT

The fail-safe disconnect feature, when enabled, causes the Model 820 KSR to disconnect from the transmission line when certain abnormal conditions occur. Disconnect is accomplished by pulsing OFF Data Terminal Ready (DTR) until Data Set Ready (DSR) has been OFF for 3 seconds. The audible alarm sounds momentarily and an "abnormal disconnect" error code is displayed to the operator. The error display is reset the next time DSR switches ON, or the [RESET] key is actuated. The failsafe disconnect feature is functional only in conjunction with communication mode parameters 11, 12 and 13.

Fail-safe disconnect occurs under the following conditions according to communications mode:

Full duplex:

- Wrong number time-out—No carrier received (DCD OFF) within 22 seconds after Data Set Ready (DSR) switches ON.
- Loss of carrier time-out—DCD OFF for 8 seconds after having been ON.

Half Duplex:

- Wrong number time-out—DCD OFF for 22 seconds after DSR switches ON unless the ABM autotrigger feature is enabled.
- Line turnaround time-out—DCD OFF for 8 seconds after a line turnaround character is transmitted.
- Loss of carrier time-out—DCD OFF for 8 seconds after having been ON, unless 1) the DCD line OFF was preceded by receipt of a line turnaround character or 2) no LTA operation is selected.
- Clear to Send time-out—Clear to Send (CTS) fails to switch ON within 8 seconds after Request To Send (RTS) is switched ON.

Half Duplex with Reverse Channel:

- Wrong number time-out—DCD OFF for 22 seconds after DSR switches ON.
- Line turnaround time-out—DCD OFF for 8 seconds after a line turnaround character is transmitted.
- Loss of carrier time-out—DCD OFF for 8 seconds after having been ON, unless 1) turnoff of DCD is preceded by turn-off of SCA (Model 820 KSR busy) or receipt of a line turnaround character or 2) no LTA operation is selected.
- Clear to Send time-out—CTS fails to switch ON within 8 seconds after RTS is switched ON.

In all cases, the "abnormal disconnect" code is not displayed if Data Set Ready switches OFF before the specified time-out elapses or if disconnect is preceded by receipt of the configured disconnect character or character sequence.

8.7 NO ACTIVITY DISCONNECT

The no activity disconnect feature, when enabled, causes the terminal to disconnect from the transmission line when no data has been received or transmitted within a continuous three (3) minute time period. Disconnect is accomplished by pulsing Data Terminal Ready (DTR) OFF until Data Set Ready (DSR) has been OFF for three

seconds. The audible alarm tone sounds and the "no activity disconnect" status code is displayed. The status code will be reset when DSR switches ON, or the [RESET] key is pressed. The no activity disconnect is functional only in conjunction with communications mode parameters 11, 12 and 13.

8.8 ABNORMAL MECHANICAL CONDITION DISCONNECT

Two abnormal mechanical conditions will cause the terminal to disconnect automatically if the proper parameters are enabled. The two disconnect conditions are:

- Paper-out
- Carriage jam.

If the disconnect parameter (configuration code 64) is enabled, and a paper-out or carriage jam condition is detected, the terminal will switch the Data Terminal Ready (DTR) line OFF and display the appropriate error code. Configuration code 64 is not functional with full-duplex communication mode parameters 14, 15 or 16 enabled if one of the following ROM sets is installed: 03B/04B, 05B/06B, or 07B/08B. If the disconnect parameter is not enabled, a busy indication is set when either condition occurs. The busy indication the terminal generates depends upon the communications mode:

- Full Duplex: A timed BREAK pulse (256 ms SPACE signal) will be transmitted unless parameter 96 is enabled. Refer to paragraph 8.11.
- Half Duplex: No response possible; Request To Send (RTS) will be held OFF following receipt of the next line turnaround character.
- Half Duplex with Reverse Channel: Reverse channel (SCA) will be switched OFF.

8.9 USING FULL-DUPLEX DIRECT WIRE MODE

The direct wire modes of operation are provided for hard-wire (back-to-back), high speed applications that do not use a data set. The direct wire modes should not be used in conjunction with a data set; conversely, data set modes should not be used for hard-wired applications.

The direct wire full-duplex modes operate generally the same as the data set full-duplex mode, except that the ready/busy status is reported via the reverse channel transmit (SCA) line.

The EIA control lines Data Carrier Detect (DCD) and Data Set Ready (DSR) must be ON for the Model 820 KSR to receive data. The control lines DSR and Clear To Send (CTS) must be ON for the Model 820 KSR to transmit data. The Model 820 KSR maintains Data Terminal Ready (DTR) and Request To Send (RTS) in an ON condition when online.

8.10 RECEIVED DATA BUFFERING: PRINTER READY/BUSY REPORTING

The Model 820 KSR is equipped with a 1280-character receive data buffer. To prevent data buffer overflow at higher data rates, the Model 820 KSR indicates busy and ready conditions to the communications line as follows. If appropriate configuration parameters are enabled, the Model 820 KSR provides a busy indication when the received data buffer is within 256 characters of an overflow condition. Following a busy indication, the terminal will indicate it is ready to receive characters again when fewer than 256 characters remain in the received data buffer. Note that the Model 820 KSR will continue to receive data even if a BUSY condition has been indicated. It is the responsibility of the transmitting equipment to stop transmission in order to prevent buffer overflow. If buffer overflow does occur, the extra characters will be ignored and error code 23 will be displayed.

The reporting methods the Model 820 KSR employs for the different communications modes are:

Direct Wire Modes:

- Configuration code 14—Reverse channel transmit (SCA) is OFF when busy, ON when ready. If configuration code 83 is also enabled, transmit DC3 when busy, DC1 when ready, as well as switching SCA.

- Configuration code 15—Reverse channel transmit (SCA) is ON when busy, OFF when ready. If configuration code 83 is also enabled, transmit DC3 when busy, DC1 when ready, as well as switching SCA.

- DC current loop option (codes 16 and 83)—Transmits a DC3 when busy and DC1 when ready.

Data Set Modes:

- Full duplex (configuration codes 13 and 83)—transmit DC3 when busy, DC1 when ready.

- Half-duplex mode (configuration code 11)—No ready/busy reporting is possible for half duplex without reverse channel.

- Half duplex with reverse channel mode (configuration codes 12 and 83)—Transmits OFF on reverse channel (SCA) when busy and switches to transmit mode when data carrier detect (DCD) switches OFF.

  Transmits the first programmed line turnaround character (LTA) when ready and switches to receive mode.

NOTE

If DCD never switches OFF, the Model 820 KSR switches ON reverse channel (SCA) when ready.

- Half duplex with reverse channel, no LTA operation (configuration codes 12, 66, and 83). Turn SCA OFF at busy and ON at ready.

8.11 BUSY/READY REPORTING FOR ABNORMAL MECHANICAL CONDITIONS

If the 09B/10B or a higher numbered ROM set is installed, an additional configuration parameter, 96, is available to control busy/ready reporting. With 96 enabled, DC3 is transmitted when paper out or carriage jam occurs; DC1 is transmitted when the fault is cleared and the reset key pressed. Parameter 96 is functional for full-duplex modes only (parameters 13, 14, 15 and 16) and has no effect in half-duplex mode (parameters 11 and 12).

The relationship of parameter 96 to the communications mode and parameter 64 is shown on the following page.

- The busy signal (transmit DC3 or switch SCA) is issued only once between ready signals; that is, if busy has already been signalled for buffer full, it will not be repeated for paper out or carriage jam.
- The ready signal (transmit DC1 or switch SCA will not be issued until the fault has been cleared, the reset key pressed, and the FIFO buffer emptied to the ready point.

Table 8-1. Busy/Ready Reporting

Communications Mode	64	96	Action On Fault	Action On Reset
13	OFF	OFF	Send "Break"	None
13	OFF	ON	Transmit DC3	Transmit DC1
13	ON	OFF	Disconnect (DTR OFF)	DTR ON
13	ON	ON	Disconnect (DTR OFF)	DTR ON
14, 15, 16	OFF	OFF	Send "Break"; Switch SCA	Switch SCA
14, 15, 16	OFF	ON	Transmit DC3; Switch SCA	Transmit DC1; Switch SCA
14, 15, 16	ON	OFF	Switch SCA	Switch SCA
14, 15, 16	ON	ON	Transmit DC3; Switch SCA	Transmit DC1; Switch SCA

Section 9

Line Command and Control Sequences

9.1 INTRODUCTION

The Model 820 KSR provides for line communications control of the terminal with two different types of commands. The first type of line command is provided by use of control characters defined by the USASCII code set. The second type of line command, available as a part of the Device/Forms Control Option, consists of character sequences which begin with the ASCII control character ESC. This section describes the Model 820 KSR use of the ASCII control character commands and the "escape sequence" commands.

9.2 CONTROL CHARACTERS

The Model 820 KSR is capable of receiving and transmitting all 33 control characters defined by the USASCII code set. Some of these control characters will produce action by the printer when received and others are transmitted by the terminal automatically when certain conditions are satisfied or when the CTRL key is depressed in conjunction with certain other keyboard keys.

9.2.1 Control Character Response

Some of the control characters of the USASCII code set have a special significance for the Model 820 KSR. These control characters and their significance are described in Table 9-1. Control characters not included in Table 9-1 will be placed in the terminal's first-in-first-out (FIFO) receive buffer but will not result in any special action by the terminal. The control character NUL is not placed in the receive FIFO and can be used as a fill character if required.

9.2.2 Graphic Representation of Control Characters

The Model 820 KSR is capable of graphically representing all 33 control characters defined in the USASCII code set. The graphic representation of control characters is used when the terminal prints a local report which contains control characters as a line turnaround character or as a part of the answerback memory. The graphic representation of control characters is also used for all control characters received from the communications line when Configuration code 87 is enabled. In this case, the Model 820 KSR prints the graphic representation instead of performing the action specified in Table 9-1. This feature is useful in the development environment when an exact knowledge of the control characters received is important. This graphic representation of control characters is shown in Figure 9-1.

9.2.3 Generation of Control Characters from the Keyboard

Several of the keys on the Model 820 KSR keyboard are capable of producing control characters for transmission to another unit. Figure 9-2 shows the positions of these keys on the keyboard. The control character codes may be generated by depressing the CTRL key in conjunction with one of these keys, or by depression of one of the special keys (RETURN, LINE FEED, DEL, BACKSPACE, ESC) which generate their respectively implied codes.

Depression of the RETURN key will cause both the control characters CR and LF to be generated if parameter 86 is enabled.

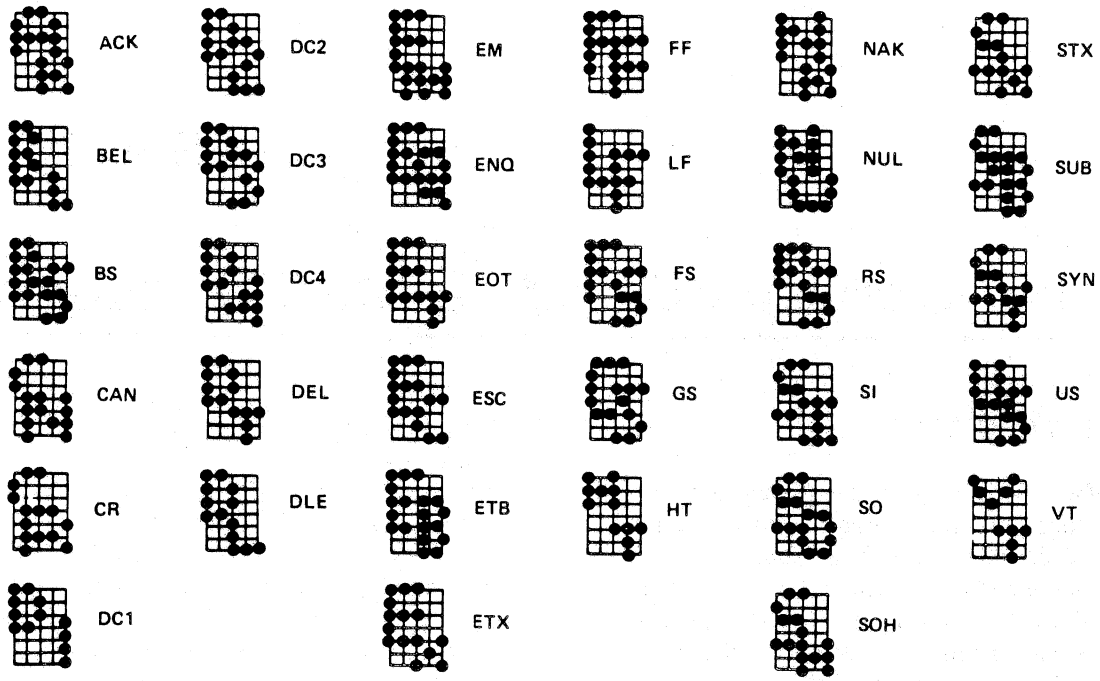


Figure 9-1. Printed Control Character Symbolization

9.3 ESCAPE SEQUENCE COMMANDS

ESC sequence commands consist of sequences of characters or keyboard entries which may be used to modify the operation of the Model 820 KSR terminal. These sequences will be initiated by the momentary depression of the ESC key on the keyboard or by the reception of the ASCII control character ESCape.

Local ESCape sequence commands, entered from the keyboard, are available on the basic terminal to allow for the establishment of different forms lengths and are available with the Device/Forms Control Option to provide a complete control of the terminal's device and forms control capability.

The use of the local command sequences are described fully in Section 5.

LINE ESCAPE SEQUENCE COMMANDS ARE ONLY AVAILABLE ON TERMINALS WHICH HAVE THE DEVICE/FORMS CONTROL OPTION INSTALLED. Commands of the Line command set may be typed from the keyboard when the Model 820 KSR is in the LCL or (•) STANDBY mode. In order for Line ESCape sequence commands to be recognized, Configuration code 81 must be enabled. These commands allow the same type of control provided by the Local commands plus some additional features designed to enhance the format control capability from the communications line.

Table 9-1. Control Characters

ASCII Control Character		Terminal Action
CR	CARRIAGE RETURN	This character moves the printhead to the left margin when printing at slow speed or initiates the printing of the next line when printing at high speed (bi-directionally). CR will also cause the Line Feed Function to occur if Configuration code 85 is enabled.
LF	LINE FEED	This character advances the paper one line space (two line spaces if double spacing). LF will also cause the Carriage Return Function to occur if Configuration code 84 is enabled.
FF	FORM FEED	This character advances the paper to the top margin of next form and positions the printhead at the left margin.
BS	BACKSPACE	This character moves the printhead one character space to the left unless the printhead is at the left margin. If the printhead is at the left margin this character is ignored.
BEL	BELL	This character sounds a short tone on the audible alarm.
NUL or DEL	NULL DELETE	These characters cause no action but differ from ignored characters in that they are not placed into the receive buffer and can therefore be used to prevent data loss due to a received buffer overflow.
EOT	END OF TRANSMISSION	This character causes the terminal to disconnect from the communications line when one of the data set communicatons modes is selected (Configuration code 11, 12, or 13) and Configuration code 62 is enabled.
DLE EOT	DATA LINK ESCAPE followed by END OF TRANSMISSION	This character sequence causes the terminal to disconnect from the communications line when one of the data set communications modes is selected (Configuration codes 11, 12, or 13) and Configuration code 63 is enabled.
ENQ	ENQUIRY	This character causes the terminal to transmit the message programmed in the answerback memory. If no message is programmed, this character is ignored.
DC1	DEVICE CONTROL 1	This character is transmitted to signal that the FIFO receive buffer is "READY" to receive more characters, if Configuration code 83 is enabled. The buffer "READY" occurs when less than 256 characters are in the receive buffer.
DC3	DEVICE CONTROL 3	This character is transmitted to signal the FIFO receive buffer "BUFFER FULL" condition, if Configuration code 83 is enabled. The "BUFFER FULL" occurs when the receive buffer is within 256 characters of overflow.
ESC	ESCAPE	This character is interpreted as the beginning of an "ESCape sequence command". This character is ignored when received from the communications line if Configuraton code 81 is not enabled or if the Device/Forms Control option is not installed in the terminal.
VT	VERTICAL TAB	This character advances the paper to the next vertical tab stop while the printhead remains in the same column. If no vertical tab stops exist between the current line and the bottom margin, the paper will advance to the top margin of the next page. This character is ignored if the Device/Forms Control option is not installed.
HT	HORIZONTAL TAB	This character advances the printhead to the next horizontal tab stop. If no horizontal tab stops exist between the present column and the right margin, this character will be treated the same as the sequence CR LF. This character is ignored if the Device/Forms Control option is not installed.
SI	SHIFT IN	This character selects the primary character set. If no alternate character set exists, this character is ignored.
SO	SHIFT OUT	This character selects the alternate character set. If no alternate character set exists, this character is ignored.

The complete set of ESCape sequence commands is shown in Tables 9-2 and 9-3. A detailed discussion of the ESCape commands is contained in the following paragraphs.

9.3.1 Form Size Commands

The form length of the Model 820 KSR may be set by using the four commands of this group of ESCape commands. This may be done by specifying the first and last line of the form or directly by entering the number of lines contained in the form represented by the italicized N contained within two of the sequences. These commands will allow the operator or communications line to set the form length to any number of lines from 1 to 84 when the printer is set for six lines per inch spacing or from 1 to 112 lines when the printer is set to use eight lines per inch spacing. The three Local commands of this group, and only these three ESCape commands, are provided on terminals which don't have the Device/Forms Control option installed.

When directly specifying the form length in number of lines, care should be taken to ensure that the number of lines specified is correct for the line spacing set in the terminal, six or eight lines per inch. Once the form length has been specified, changes between six and eight lines per inch spacing will not affect the physical form length.

NOTE

If the auto/per formation skip feature is enabled, Configuration code 92, a minimum form length of one inch will be established. (Six lines at 6 LPI spacing and eight lines at 8 LPI spacing.)

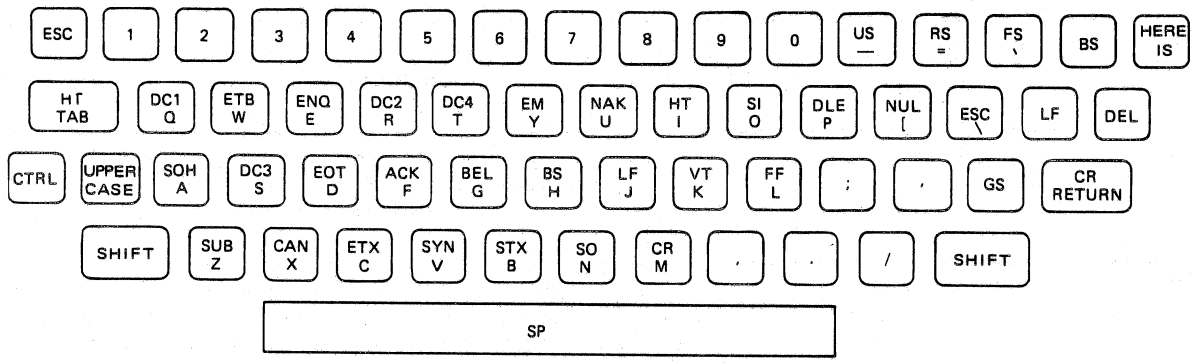


Figure 9-2. Control Character Layout

Table 9-2. Forms Setup Commands

Function Type	* Sequence = ESC Followed By		Definition of Commands
	LCL/STBY	Line (1)	
Form Size	5 *N* CR	[*N* t	Form Length = *N*; Top of Form = Present Line
	5 CR		Top of Form = Present Line
	5 0 CR		Bottom of Form = Present Line
Form Margins	6		Left = Present Column
	DEL 6		Left = Column 1
	7		Right = Present Column
	DEL 7		Right = Default Value
	8		Top = Present Line
	DEL 8		Top = Default Value
	9		Bottom = Present Line
	DEL 9		Bottom = Default Value
	0		Clear All To Default Values
		[*N* r	Top = Line Number *N*
		[; *M* r	Bottom = Line Number *M*
		[*N* ; *M* r	Top = *N*; Bottom = *M*
		[*N* s	Left = Column Number *N*
		[; *M* s	Right = Column Number *M*
		[*N* ; *M* s	Left = *N*; Right = *M*
Horizontal Tabulation	1	H	Set At Present Position
		[2 g	Clear All Horizontal Tabs
		[M_1 ; ...	Set At Columns Indicated
		... ; M_X u	(Up To 16 *M* Values)
	2	[0 g	Clear At Present Position
Vertical Tabulation	3	J	Set At Present Position
		[4 g	Clear All Vertical Tabs
		[N_1 ; ...	Set At Lines Indicated
		... ; N_X v	(Up To 16 *N* Values)
	4	[1 g	Clear At Present Position
Forms Storage	VT *N*	P K *N* ESC \	Store Present Device/Forms Parameters In Memory *N*
	TAB *N*	P L *N* ESC \	Recall Device/Forms Parameters From Memory *N*
	TAB 0	P L 0 ESC \	Load Default Device/Forms Parameters

* Note: There are no spaces between characters in the ESCape command sequences. Spaces are shown for clarity only. Variables represented by italicized letters M and N are ASCII numbers, not binary numbers as used by the Model 810 Printer.

Table 9-3. Device Control Commands

Function Type	* Sequence = "ESC" Followed By			Definition of Commands
	LCL/STBY	Line	Alternate	
Printer Control	-	P A ESC \	P A \	6 Lines/Inch (Single Space, 6 LPI)
	=	P B ESC \	P B \	Double Space, 6 LPI (3 Line/Inch)
	—	P H ESC \		8 Lines/Inch (Single Space, 8 LPI)
	+	P G ESC \		Double Space, 8 LPI (4 Line/Inch)
	>	P C ESC \	P C \	10 Char/Inch (Standard Print)
	.	P I ESC \		Expanded Print, 10 CPI (5 Char/Inch)
	<	P D ESC \	P D \	16.5 Char/Inch (Compressed Print)
	,	P J ESC \		Expanded Print, 16.5 CPI (8.25 Char/Inch)
		P E ESC \	P E \	Printer Off
		P F ESC \	P F \	Printer On
Keyboard Control		` (grave accent)		Keyboard Lock
		b		Keyboard Unlock
Display Control	LINE FEED			Display Current Line Number
	SPACE BAR			Display Next Column Number
Relative Tabulation		[*M* `		Horizontal Tab Right To Column *M*
		[*M* a		Tab Right Exactly To *M* Columns
		[*N* d		Advance to Line *N*, Relative To Top
		[*N* e		Advance Exactly *N* Lines
Report Control		[c		Send Configuration Report
		[n		Send Status Report

* Note: There are no spaces between characters in the ESCape command sequences. Spaces are shown for clarity only. Variables represented by italicized letters M and N are ASCII numbers, not binary numbers as used by the Model 810 Printer.

9.3.2 Form Margins

The form margins, available on terminals equipped with the DFC option, establish inclusive boundaries within which the terminal will print. A carriage return will logically move the next printing position to the column designated as the left margin. Advancing the terminal's active print position past the right margin will cause the terminal to execute a carriage return and line feed function. A form feed will place the active print position at the first print position (left margin) of line designated as the top margin on the next form. A line feed past the bottom margin will result in the terminal advancing the paper to the next top margin while the printhead remains in the same column.

The margins may be set by the line ESCape command sequences without moving the printhead. This is done by transmitting the appropriate line command from Table 9-3 and replacing the italicized letter N or M with the column or line number where the margin is desired. Default margins may be specified from the line by replacing the italicized letter N or M with a zero. The default value of the margins are dependent upon the Configuration codes enabled and on the horizontal pitch. Default values are:

Left margin = column 1
Top margin = line 1 (unless auto perforation skip, Configuration code 92, is enabled, then it is line 3).
Bottom margin = Form length (unless auto perforation skip is enabled, then it is form length minus one line).
Right margin = (See Below)

Configuration Codes Enabled	Horizontal Pitch 10 CPI	16.5 CPI
Neither 89 nor 93	Column 132	Column 218
Code 89	Column 80	Column 80
Code 93	Column 80	Column 132
Both 89 and 93	Column 80	Column 80

9.3.3 Horizontal and Vertical Tabs

The Model 820 KSR, with the DFC option, has 132 (218 with the compressed print option) possible horizontal tabs and 112 possible vertical tabs. Tab stops are controlled based on column or line numbers not the physical position on the paper. Therefore changing either the horizontal pitch or vertical line spacing will also change the physical position of the tab stops.

The line ESCape commands for setting of tab stops can be used to independently set and clear both horizontal and vertical tab stops. The line commands for setting tabs permit the setting or clearing of multiple tabs with one command or the individual setting of tabs as provided with the local commands. The command for setting multiple tabs permits tabs to be set without moving the printhead or paper. This is done by having tab positions specified by line or column number with multiple parameters separated by semicolons. Tab stops, both vertical and horizontal, may be set without regard to margins.

9.3.4 Forms Storage

The Model 820 KSR contains one permanent read/write memory location which is used as an operating memory, two permanent read/write memory locations which are used for additional forms storage, and one permanent factory set read only memory location which is used for the default format parameters. All format parameter settings are loaded directly into the operating memory location and are remembered by the terminal after power has been turned off. This is done automatically as each parameter is set, and therefore the Model 820 KSR will always remember new parameters entered.

The form in the operating memory location will be changed each time a different parameter is entered. The two additional permanent read/write memory locations are not affected by new parameter entries. Once a form set up is stored in one of these memories, it will be remembered until another store command is executed for that memory. A forms set up from one of these two memories may be loaded into the operating memory by executing either a local or line recall command. The desired memory location is designated by replacing the italicized N in the store or recall command by 1 or 2.

Prior to loading the form set up from the storage location into the operating memory, the terminal will compare the parameters of the stored form with any operating limits which may have been

established by enabling Configuration codes 88 through 93. If any conflicts exist, i.e., the right margin of the stored form set up is specified as greater than column 80 and Configuration code 89 (maximum right margin of column 80) is enabled, the terminal will treat that recall command as an invalid escape sequence.

The Model 820 KSR also contains a factory set default format capability which is stored in a permanent read-only memory. A default format will be loaded into the read/write operating memory when either the local or line escape command to "load default device/forms parameters" is executed or the non-volatile memory fails to pass the power-up tests. The parameters of the default format are dependent upon any operating limits established by the enabling of configuration codes 88 through 93, and therefore the default format may always be loaded regardless of configuration code settings. The parameters of the factory set default format are:

Horizontal Pitch	= 10 characters per inch (if configuration code 88, compressed printing only, is enabled, then it is 16.5 CPI).
Vertical Pitch	= 6 lines per inch (if configuration code 91, 8 lines per inch only, is enabled, then it is 8 LPI).
Form Length	= 66 lines (if configuration code 91 is enabled, then it is 88 lines).
Margins	= All margins are set at the default values. (See paragraph 9.3.2 for these values.)
Tab Stops	= All existing horizontal and vertical tab stops are cleared and no tab stops are set.

NOTE

The "top of form" will be set at the present paper position when either a recall or load default format command is executed. In order for a new form to be properly aligned by these commands, it is necessary that the paper is properly aligned at the desired top of form prior to execution of either of these commands.

9.3.5 Printer Control Commands

This group of commands available with the DFC option may be used to control the horizontal and vertical pitch and for switching the print mechanism off or on from the communications line. Several of the functions in this group have two different character sequences defined as line command sequences. Those command sequences identified as alternate are provided to insure compatibility with the Model 820 Keyboard Send-Receive terminals that do not inlcude any of the upgraded features.

9.3.5.1 Vertical Line Spacing. The terminal can print with two different vertical line spacings, six lines per inch and eight lines per inch. It can also use the double spacing feature of DFC option to provide two more vertical line spacings and thus provide effectively four different choices of line spacing. The terminal's control of related forms functions, form length, top and bottom margins, vertical tab stops, relative tabbing, and vertical position within the form, are based on the single space (6 or 8 LPI) vertical line spacing.

Changing the vertical line spacing between 6 and 8 lines per inch will cause the terminal to set the top and bottom margins to their default values. Changing between single and double spacing within the same vertical line spacing does not affect the position of the top or bottom margin.

9.3.5.2 Horizontal Pitch. The Model 820 KSR with the compressed print option can print with two different horizontal characters spacings, 10 characters per inch and 16.5 characters per inch. It can also use the expanded print feature of the DFC option to double the width of printed characters to effectively provide four different choices of horizontal character spacing. The terminal's control of related form functions, left and right margins, horizontal tab stops, relative tabbing, and the position within the print line are based on the standard (non-expanded) horizontal pitch.

Changing the horizontal character spacing to or from 10 and 16.5 characters per inch will cause the terminal to realign the position of the printhead to a new physical location corresponding to the same column number in the new horizontal pitch. Pitch changes between 10 and 16.5 characters per inch within lines of printed data are not recommended due to the possibility of overprinting or leaving undesired blank spaces. Pitch changes between 10 and 16.5 characters per inch set the left and right margins to their default values.

Changing between standard and expanded printing within the same horizontal pitch (10 or 16.5 CPI) will not realign the printhead nor affect the position of the left and right margins. Therefore mixing standard and expanded prints (of the same horizontal pitch) in the same line of data is an acceptable type of operation.

NOTE

Expanded, double width characters are printed using an effective 18 by 7 dot matrix and therefore require twice as long to print as characters printed with standard (9 by 7 dot matrix) horizontal pitch.

9.3.5.3 Printer ON/OFF. The Model 820 KSR with the DFC option provides the capability for the printing mechanism to be switched off from the communication line. Once the terminal receives the printer OFF command sequence, all data received from the communication line will be discarded until the printer OFF status is cleared by receipt of the printer ON command, the depression of the RESET key on the terminal's operator control panel, or by the terminal's LINE/•/LCL switch being placed to the LCL position (disconnecting the terminal from the communications line). The receipt of the printer OFF command does not cause the terminal to change the signal level on any of the communications control lines.

The terminal will locally indicate the printer OFF status by a long audible tone upon activation of the status and by flashing the printer OFF status code in the 3 digit display of the operator control panel until the status is cleared.

9.3.5.4 Keyboard Lock/Unlock. The Model 820 KSR equipped with the DFC option provides the capability for the keyboard to be ignored upon command from the communications line. Once the terminal receives a keyboard "lock" sequence from the line, only the keys on the operator control panel (RESET, FORM ADV, BREAK, ↑, ↓) and the HERE IS key are active. None of the other keys are functional until the printer receives a keyboard "unlock" sequence, whereupon operation of the keyboard return to normal. Switching the terminal from LINE to LCL mode will also perform this function.

9.3.6 Display Control

In the basic Model 820 KSR, the 3 digit display will contain the column number of the next print position when the terminal is in a normal operating mode. With DFC option, the capability is provided for local terminal operator to select either a column number display or a line number display.

The column numbers will always be displayed with three digits (i.e., 005 is column five) and may range from 001 to 132 (218 if the compressed print option is installed). The line numbers will be generally displayed as two-digit numbers (i.e., 05 is line five). If the terminal is in 8 lines per printing, it is possible to have line numbers greater than 99 and therefore all three display positions are required. In this event (line numbers 100 through 112), it is not possible to determine only from the display whether a line or column number is being displayed.

In summary, a display which contains only two digits (the leftmost display is blank) is a line number display. A display which contains three numeric digits in the range 001-099; 113-218 indicates a column number while numbers in the range 100-112 generally indicate a column number but may be line numbers. The display always indicates column number after power-up regardless of the display mode when power was removed.

9.3.7 Relative Tabulation

The Model 820 KSR with the DFC option is capable of performing relative tabulation either horizontally or vertically using either the base position (column 1 or line 1) or the current horizontal or vertical position as a reference point. This is done by using the line commands provided and

replacing the italicized letter (*N* or *M*) in the command with the desired number of columns or lines that the printer should advance from the reference point.

These commands always interpret the number of columns as being in 10 or 16.5 CPI spacing and the number of lines as being in the single-space 6 or 8 LPI spacing. Therefore to move 4 expanded character widths from the reference position, the number of columns specified would have to be 8. This would place the printhead 8 columns to the right of the reference position, which is 4 character widths in expanded printing. The printer can move an odd number of columns or line spaces when it is in expanded printing or double line spacing thereby allowing the terminal to move to any column or line number defined as valid for 10 or 16.5 CPI/6 or 8 LPI. These commands should be particularly useful when centering material within the form.

Horizontal relative tabulation commands that do not move the printhead to the right of its current position or that would cause the printhead to advance past the right margin will be treated as invalid line command sequences. Vertical relative tabulation commands which do not advance the paper or which would cause the paper to advance past the bottom margin will also be treated as invalid line command sequences.

An invalid line command sequence will cause a status code 29 to be set in the terminal. This status code (number 29) is not displayed in the three-digit display, but will be sent as a part of the status report.

9.3.8 Report Control

The Model 820 KSR with the DFC option is capable of transmitting two reports in response to a communications line request. These reports are:

- The Configuration Report—This report is transmitted upon receipt of the Send Configuration Report command from the communications line. The report transmitted will have the following format:

  ESC [8 2 0; C_1; C_2...C_N cX,

  where C_1...C_N are the configuration codes which are enabled and X represents the first programmed line turnaround character (if any are programmed).

- The Status Report—This report is transmitted upon receipt of the Send Status Report command from the communications line. This report will have the following format:

  ESC [8 2 0; C_1; C_2...C_NnX

  where C_1...C_N are the status codes which are active in the terminal and X represents the first programmed line turnaround character.

NOTE

If a status code 11 or 12 (carriage jam and paper out) is active, the terminal will cease to process printable characters from the FIFO receive buffer. A status report request received after a carriage jam or paper out condition occurs will be placed in the FIFO behind any characters not yet processed and therefore the terminal will rarely respond to a status report request when a paper out or carriage jam condition is present.

Section 10

Preventive Maintenance and Self-Test Procedures

10.1 INTRODUCTION

This section describes cleaning and lubricating procedures the operator should perform to maintain the Model 820 KSR in optimum operating condition. The operator should not attempt to repair or replace parts and assemblies such as the printhead, paper handling mechanism, keyboard, etc. Instead, refer qualified technicians to the Model 820 RO/KSR Maintenance Manual (TI Part No. 2206552-9701) for maintenance procedures, schematics, and assembly drawings.

10.2 PREVENTIVE MAINTENANCE

The terminal is designed to provide reliable service with a minimum of operator maintenance. In order to maintain the highest level of operation, the following procedure should be followed once each month.

WARNING

Set the terminal ON/OFF switch to OFF to avoid electrical shock hazards.

1. Switch terminal power to OFF.

2. Lift the cover and carefully vacuum paper chaff from the printhead and ribbon path areas (Figure 10-1).

3. On all models, clean upper and lower guide rods throughly with a soft, clean, lint-free cloth.

   Except on models designated oil-free bearings, the following procedure applies:

   Pull the carriage across the guide rods several times if any uneveness is noted. Oil **only** the upper guide rod in the following manner. Place the carriage in the center of the guide rod. Apply *only* two drops of oil to the guide rod on each side of the carriage. Pull the carriage across the full width of the guide rod several times.

CAUTION

Never oil the lower guide rod and never apply more oil than specified.

10.3 SELF-TESTS

The Model 820 KSR provides automatic self-test functions to verify correct terminal operation. Two types of self-tests are built into the terminal.

- Power-up diagnostic tests
- Maintenance tests

10.3.1 Power-Up Diagnostic Tests

The following sequence of tests is performed in the order indicated each time power is applied to the terminal.

10.3.1.1 Indicator Test. The indicator test is initiated at the beginning of the power-up sequence. The LED indicators switch on, and the digital display shows 888. The indicator test continues until the power up sequence is complete.

10.3.1.2 RAM Test. The terminal processor exercises its random access memory (RAM) to verify

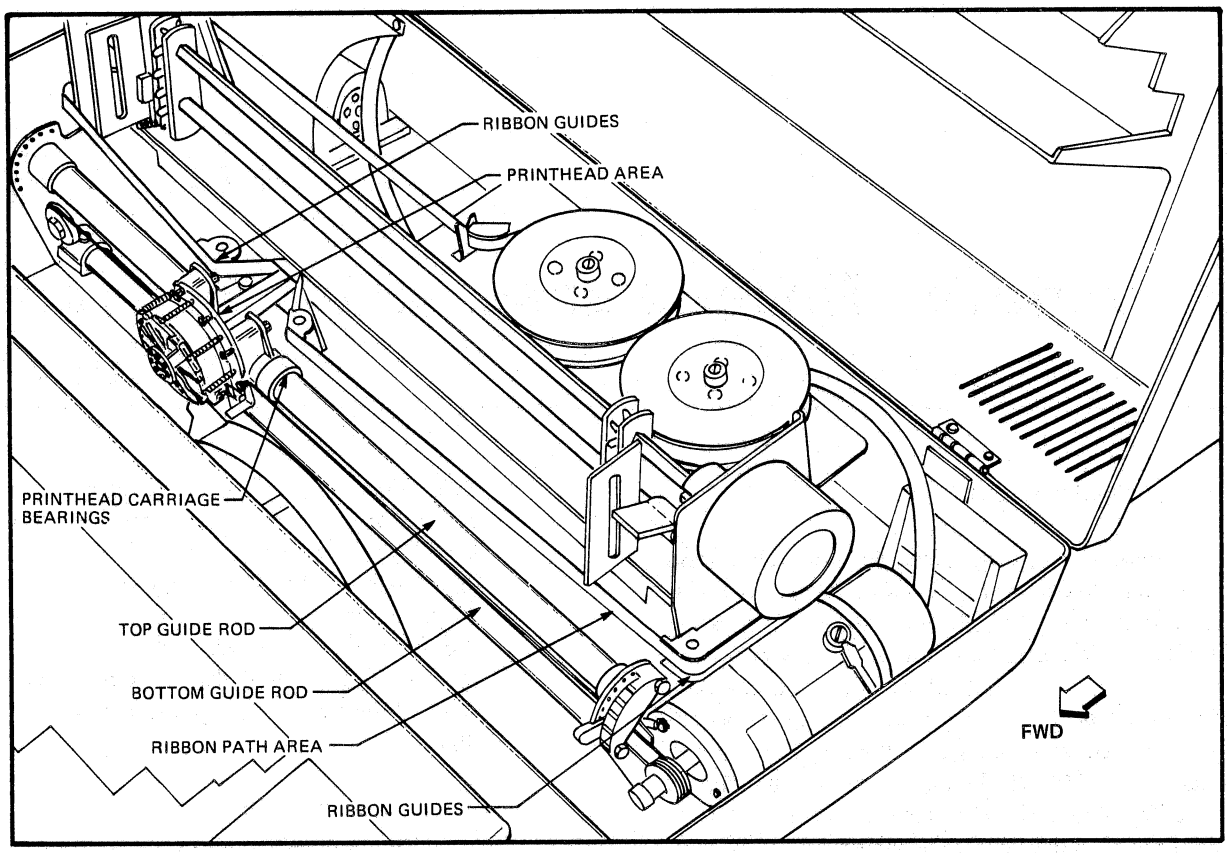


Figure 10-1. Printhead Area, Guide Rods, and Ribbon Guide

that data can be written to (recorded) and read (played back) from each memory location. A checkerboard pattern is written and read, followed by writing and reading of an inverted checkerboard pattern. If an error is detected, a RAM failure error code is activated and is displayed on the TSD. The processor proceeds to the next test, but there is no assurance that subsequent test results are valid (a small portion of the RAM, required to execute the test program, is not tested by the checkerboard pattern).

10.3.1.3 ROM Test. The main processor performs a cyclic redundancy character check (CRC) of its standard read-only memory (ROM), plus any installed option ROM's. If the result of the CRC test is incorrect, a ROM failure error code is activated and displayed. The processor proceeds to the next test, but subsequent test results may not be valid.

10.3.1.4 Nonvolatile Memory Test. The main processor computes the checksum of the contents of the non-volatile memory (configuration and format parameters). If an error is found, the processor reloads the configuration memory with default configuration and format parameters, and a nonvolatile memory error code is activated and displayed.

10.3.1.5 Audible Alarm (Tone) Test. Upon completion of the memory tests and memory initialization, the audible tone is sounded for 80 milliseconds. The terminal controller processor then executes a power-up sequence. The last portion of the sequence causes the printhead to align to the left margin.

If any power-up test failures occur, the audible tone will sound for 1 second, and the appropriate error code(s) will be displayed in the TSD. In either case the LED indicators assume their normal status.

10.3.2 Maintenance Tests and Reports

A number of maintenance tests and reports are provided in the Model 820 KSR terminal. These tests and reports are described in the following paragraphs.

10.3.2.1 Barberpole Test. The barberpole test causes the printer mechanism to print all 95 characters of the standard character set in a repetitive "barberpole" pattern at maximum print speed. The pattern is printed within the defined margins.

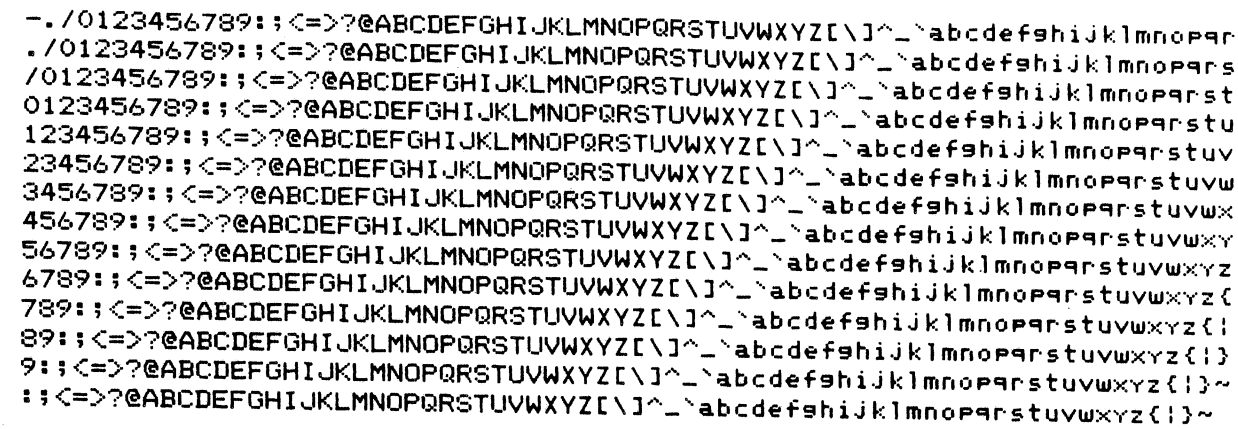
To exercise the terminal logic to the fullest extent possible, the test pattern is generated by the processor, transmitted, and looped back internally (inside the EIA interface circuits and any optional line interface) from the terminal transmitter output to the terminal receiver input before printing.

The barberpole test may be initiated using the following procedures:

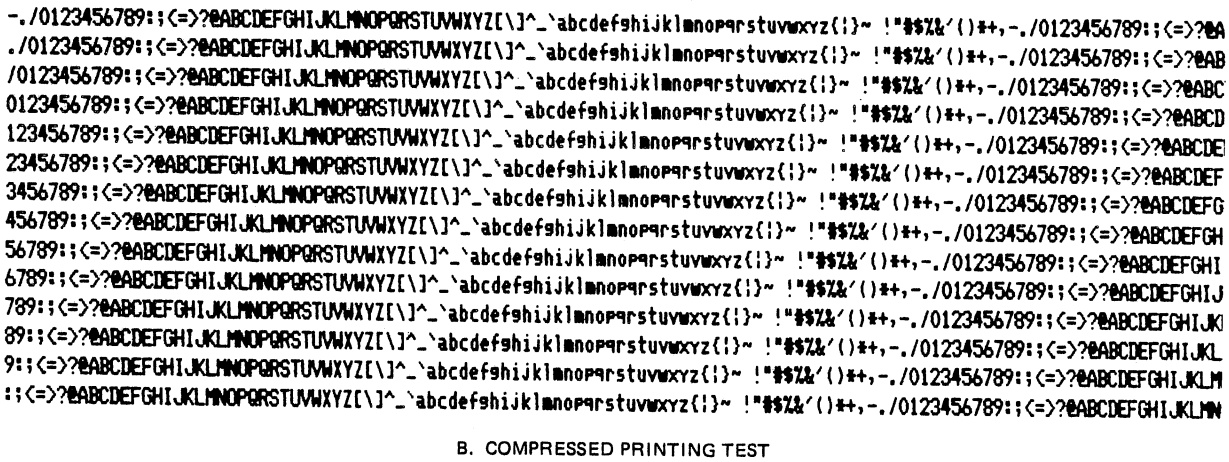
1. Set the LINE/•/LCL switch to LCL.
2. Depress the [CTRL], [SHIFT], and [1] keys together. The terminal will respond by printing the barberpold pattern and displaying status code 39 (test in progress) on the TSD.
3. Terminate the test by pressing the [RESET] key.

Figure 10-2 shows an example of the barberpole test in standard (10 CPI) and compressed (16.5 CPI) character spacing.

10.3.2.2 Communications Test. The communications test initiates a signal pattern to test the communications line. When the test is initiated, pressing any code generating key on the keyboard will cause the terminal to transmit the



A. STANDARD PRINTING TEST



B. COMPRESSED PRINTING TEST

Figure 10-2. Normal Results of the Barberpole Test

corresponding code continuously until another key is pressed or the test is terminated. The character is transmitted at the configured baud rate (speed). The procedure for initiating and terminating the test is described below.

1. Set the LINE/•/LCL switch to LINE. The Model 820 KSR must be connected to another terminal, or have a loopback plug installed before this test will be active.

2. Simultaneously press the [CTRL], [SHIFT], and [2] keys. The terminal will respond by displaying status code 39 (test in progress) on the TSD.

3. Press any code generating key on the keyboard. If different characters are required during the test, simply press the key for the new character desired. Each time a character key is pressed, the terminal will terminate transmission of the current character and begin to transmit the new character.

4. To terminate the test, momentarily press the [RESET] key: The display on the TSD will resume its normal indication.

This test is intended to aid in the adjustment of the transmit level of any data set to which the terminal may be attached.

10.3.2.3 Configuration Report. This test provides a printed report of the current terminal configuration. The configuration report may be initiated as follows:

1. Set the LINE/•/LCL switch to LCL (or •).

2. Depress simultaneously the [CTRL], [SHIFT], and [3] keys. The terminal responds by printing:

$C_1;C_2.....C_NXXX$
AA.....A

Each term $C_1/C_2.....$, C_N is a two-digit number corresponding to the enabled configuration parameters as described in paragraph 4.4.2; the terms X are the programmed line turnaround characters; the terms AA.....A are the programmed answerback memory message.

Parameter 09 is never reported and parameters 01-08 are not reported unless the associated configuration set is protected. Program mode commands 60, 70 and 80 are not reported. The ABM is reported only if parameter 72 is enabled.

10.3.2.4 ROM Identification Report. This report provides a printed message which identifies the ROMs installed in the Model 820 KSR data terminal. The ROM identification report may be initiated as follows:

1. Set the LINE/•/LCL switch to LCL.

2. Depress [CTRL], [SHIFT], and [4] simultaneously. The terminal responds by printing:

ID1/ID2/ID3 or ID1/ID2/—

The terms ID1, ID2, and ID3 are unique codes which identify the ROMs installed in the terminal. The "—" is displayed if the Device/Forms Control option is not installed.

10.3.2.5 Device Forms Parameter Report. This report provides a printed copy of the format parameter settings. The format report is initiated as follows:

1. Set the LINE/•/LCL switch to LCL (or •).

2. Depressing the [CTRL], [SHIFT], and [5] keys simultaneously.

The terminal responds by printing:

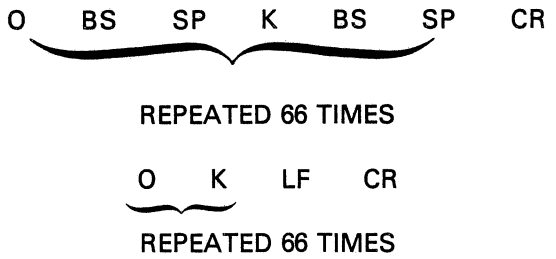
AAA;BBB;CCC;DDD;EEE;F;GG

where

AAA is the form length in lines (001-112)
BBB is the left margin column number (001-218)
CCC is the right margin column number (001-218)
DDD is the top margin line number (001-112)
EEE is the bottom margin line number (001-112)
F is the line spacing in lines/inch (3,4,6,8)
GG is the character font in characters/inch (05,08=8.25, 10, 16=16.5)

10.3.2.6 Terminal Run-In Test. This test is provided to facilitate factory run-in of the Model 820 KSR. In this mode, the transmitted data output is

connected to the received data input to exercise the electronics to its fullest extent. The test prints a line of data in a low-speed printing mode by using backspaces and then overprints the same line at high speed. The sequence used is:



The test is initiated as follows:

1. Set the LINE/•/LCL switch to LCL (or •).

2. Depress the CTRL, SHIFT, and 6 keys simultaneously. During this test, the "Test in Progress" status code is displayed. The test is terminated by momentarily depressing the RESET key.

Appendix A

USASCII/APL Codes

ASCII/APL CHARACTER Set. The USASCII/ APL character set is shown in Table A-1.

Table A-1. USASCII/APL Character Set

	CONTROL CODE		ASCII						APL					
	ASCII or APL		ASCII						APL					
COLUMN	0	1	2	3	4	5	6	7	2	3	4	5	6	7
ROW 0	NUL	DLE	SP	0	@	P	`	p	SPACE	0	−	·	◇	P
1	SOH	DC1	!	1	A	Q	a	q	¨	⌊	⍟	?	A	Q
2	STX	DC2	"	2	B	R	b	r	)	2	⌶	⍴	B	R
3	ETX	DC3	#	3	C	S	c	s	<	3	∩	⌈	C	S
4	EOT	DC4	$	4	D	T	d	t	≤	4	⌊	~	D	T
5	ENQ	NAK	%	5	E	U	e	u	=	5	∈	⌈	E	U
6	ACK	SYN	&	6	F	V	f	v	>	6	—	∪	F	V
7	BEL	ETB	'	7	G	W	g	w	]	7	∇	⍵	G	W
8	BS	CAN	(	8	H	X	h	x	∨	8	Δ	⊃	H	X
9	HT	EM	)	9	I	Y	i	y	∧	9	⌈	⌊	I	Y
A	LF	SUB	*	:	J	Z	j	z	≠	(	∘	⊂	J	Z
B	VT	ESC	+	;	K	[	k	{	÷	[	'	←	K	{
C	FF	FS	,	<	L	\	l	¦	,	;	⍞	⊢	L	⊣
D	CR	GS	−	=	M	]	m	}	+	×	⌈	→	M	}
E	SO	RS	.	>	N	^	n	~	.	⍪	⊤	≥	N	$
F	SI	US	/	?	O	—	o	DEL	/	\	○	-	O	DEL

NOTE:

Row and column designators are base 16 (hexadecimal) and a character is defined by a two-digit (Column/Row) hex number (e.g., ASCII M = 4D)

The ASCII control characters are generated on the Model 820 KSR by simultaneously depressing the CTRL key and the keys shown in Figure A-1.

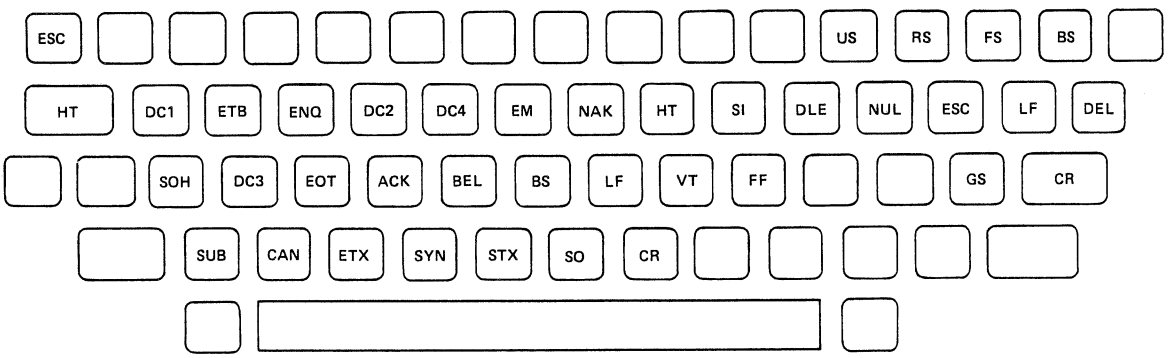


Figure A-1. Model 820 KSR Control Character Keyboard Layout

Appendix B

Configuration Table

This appendix is provided as a quick reference only. Some configuration parameters are affected by other parameters and, in some cases, operation is dependent on the ROM set installed. Refer to the text of the manual for detailed information.

Code	Meaning
	Predefined Configuration Selection (One Only)
01-08	Select corresponding predefined configuration set (option required)
09	Select standard default configuration set
	Communication Mode Selection (One Only)
11 (1)	Half duplex
12 (1)	Half duplex with reverse channel
13 (2)	Full duplex (For type 103, 113, and 212 data sets)
14	Full duplex reverse channel ON for ready (console mode)
15	Full duplex reverse channel OFF for ready (console mode)
16	DC current loop (option required)
	Transmission Rate Selection (One Only)
21	110 baud
22	200 baud
23	300 baud
24	600 baud
25	1200 baud
26	2400 baud
27	4800 baud
28	9600 baud
29 (2)	300/1200 baud (For 212 data sets with auto select option)
	Parity Selection (One Only)
31	Transmit odd parity, receive parity checkoff
32 (2)	Transmit even parity, receive parity checkoff
33	Transmit odd parity, indication on receive error
34	Transmit even parity, indication on receive error
35	Transmit odd parity, indication plus printed symbol on receive error
36	Transmit even parity, indication plus printed symbol on receive error
37	Transmit mark parity, receive parity checkoff
38	Transmit space parity, receive parity checkoff

Code	Meaning
	Line Control Parameters (No Limit)
60	Program line turnaround character(s) for half duplex
61 (3)	Enable fail-safe disconnect
62 (3)	Disconnect on receipt of EOT
63 (3)	Disconnect on receipt of DLE EOT
64 (4)	Enable paper out or carriage jam disconnect
65 (3)	Enable no activity disconnect
66	Enable half-duplex operations without line turnaround characters (with or without reverse channel, codes 11 and 12)
67	Transmit CR and 1st programmed LTA character on RETURN from keyboard (half duplex only)
	Transmission Control Parameters (No Limit)
70	Program answerback memory (ABM)
71 (4)	Auto-trigger ABM on connection
72	Enable printing of ABM contents (Local configuration report or with code 82 set)
	Terminal Control Parameters (No Limit)
80	Program the ENTER key on the optional numeric pad
81	Enable recognition of device and format control commands from the communication line (Optional)
82	Enable local copy of transmitted data
83	Transmit DC3 or "Break" on printer busy, DC1 on ready
84	Do "New Line" on receipt of LF character
85	Do "New Line" on receipt of CR character
86	Transmit CR, LF on RETURN from keyboard
87	Print all control characters
88	Set compressed print only (Optional)
89	Set absolute right margin at column 80
91	Set 8 lines per 2.54 cm (inch) only
92	Enable auto perforation skip over
93	Set absolute printed line length of 8 inches
96 (5)	Transmit DC3 on paper out or carriage jam; transmit DC1 when fault is cleared and RESET pressed
⌐¬ ⌐¬	Invalid configuration code has been entered

Notes:

1. Half-duplex operation: Configuration codes 11 and 12 should be selected only when operating with true half-duplex data sets such as the Bell 202 series.
2. Designates standard default parameter set.
3. Valid only when parameter 11, 12 or 13 is enabled.
4. Valid only with parameter 11, 12 or 13 enabled if ROM set 03B/04B, 05B/06B or 07B/08B is installed. Valid for all communication modes if higher numbered ROM set is installed.
5. This feature is not available with ROM set 03B/04B, 05B/06B or 07B/08B installed.

Selecting Configuration Code Parameters ON-OFF: (61-67, 71, 72, 89-93, 96)

These parameters may be selected by typing the corresponding two-digit code and pressing the RETURN key. A selected parameter may be disabled by entering its two-digit code, or by actuating the TAB key until the code is displayed, and then pressing the DEL (delete) key.

Multiple Choice: (01-09, 11-16, 21-28, 31-38)

These parameters are divided into subsets that require exactly one parameter per subset to be enabled at any given time. Parameters are changed by typing the code corresponding to the new parameter choice and actuating the RETURN key. Entry of the new parameter automatically cancels the previously selected parameter from the same subset.

Special Program Mode commands: (Code 60, 70, and 80)
These commands permit programming the line turnaround characters for half-duplex operation, the answerback memory message, and the optional ENTER key contents.

Configuration Selection 01 through 08
These codes call up customer defined configurations from the option PROM. If a code is entered for which there is no corresponding configuration programmed in the PROM, a configuration error is signaled and the current configuration is maintained.

09
Calls up the default configuration stored in ROM. If an option PROM containing a user defined configuration is installed, the entry of this code causes a configuration error to be displayed. The current configuration is maintained.

Communication Modes
11, 12, 13
These three parameters provide a choice of the three standard data set communications modes for communications applications, using either private lines or the switched communications network.

14,15
These parameters provide a choice of two full-duplex modes for computer peripheral device applications where the Model 820 KSR is wired directly to the host system or device. In these modes the reverse channel (Secondary Request to Send) is turned on and off to provide a terminal ready/busy indication. "Busy" is indicated for buffer full, LINE/•/LCL switch in LCL or Standby position or non-operational status, such as paper out or carriage jam. (Use of reverse channel in this manner does not comply with the signal definition of EIA RS-232-C or CCITT V24).

If parameter 14 is enabled, reverse channel turns off when the receive data buffer is within 256 characters of overflow and on when it is within 256 characters of being empty.

If parameter 15 is enabled, reverse channel operation is inverted; that is, reverse channel turns on when the buffer is within 256 characters of overflow and off when within 256 characters of being empty.

16
This parameter should be used for operation with the DC Current Loop option.

Parameters 11 through 16 are multiple choice/mutually exclusive. Local copy of transmitted data is available in all transmission modes, including full duplex, by enabling configuration parameter 82.

Parity Parameters
31-38
These parameters provide mutually exclusive/multiple choice selection of one of eight possible combinations of parity sense for both received and transmitted data and parity checking of received data.

Definitions:

Odd parity—bits 1 through 8 of each character contain an odd number of 1's or marking bits.

Even parity—bits 1 through 8 of each character contain an even number of 1's or marking bits.

Bit 8 Spacing—bit 8 is always the same polarity as the start bit.

Bit 8 Marking—bit 8 is always the same polarity as the stop bit.

Indication only—the audible alarm sounds momentarily and the TSB displays an error code anytime a character with incorrect parity is received. The message continues to be displayed by the TSB until the RESET key is actuated or a terminal status report is transmitted.

Parity error symbol printed—in addition to the indication described above, the character in error is replaced by a special parity error symbol ◆.

Line Control Parameters
60
Entering parameter 60 followed by RETURN enables programming of up to three line turnaround (LTA) characters for half-duplex communications. The TSB will display ␣␣, indicating that the first line turnaround character may be entered from the keypad. The character count advances, up to a maximum of 3, as each character is entered. If fewer than 3 LTA are required, the programming sequence may be terminated by

actuating the [HERE IS] key. When the third character has been entered or the [HERE IS] key depressed, the TSB display advances to the next enabled configuration code.

The key stroke sequence [6] [0] [RETURN] [HERE IS] erases any LTA characters previously programmed. The sequence [6] [0] [DEL] sets configuration error status. Code 60 is not displayed when the configuration is scanned by activating the [TAB] key, whether or not any LTA characters are programmed.

If half-duplex mode is selected and no turnaround character is programmed the TSB will display error status code [10] when the CONFIGURE/OPERATE switch is returned to OPERATE, the audible alarm will sound for one second, and online operation is inhibited. If code 66 is enabled, this error will not occur.

The first programmed line turnaround character is transmitted automatically at the end of each configuration or status report.

61
Enables the failsafe disconnect feature.

62, 63
Parameters 62 and 63 enable recognition of either the ASCII control character EOT or EOT preceded immediately by DLE, or both, as disconnect characters. EOT should not be chosen as both a disconnect and a turnaround character. If it is, disconnect will occur upon receipt of EOT.

64
Enabling of parameter 64 causes the Model 820 KSR to disconnect by turning off Data Terminal Ready when a carriage jam or "paper out" condition is detected. If parameter 64 is disabled, a "busy" signal depends upon the communications mode:

- Full duplex—timed break pulse (256 ms spacing signal) transmitted.
- Half duplex—no response possible: Request to Send (RTS) will be held OFF following receipt of next line turnaround character.
- Half duplex with reverse channel—Reverse channel (SCA) is switched OFF.

Enabling or disabling of parameter 64 has no effect upon the busy signal provided on circuit SCF when operating in one of the "direct wire" modes (parameters 14, 15 and 16). Similarly, parameter 64 is unaffected by parameters 14, 15 and 16.

65
Enabling parameter 65 causes the terminal disconnect from the data set when no data has been transmitted or received for three (3) minutes.

66
Enabling parameter 66 allows the terminal to operate in half duplex (code 11) or half duplex with reverse channel (code 12) without the use of line turnaround characters.

67
Enabling parameter 67 when configured in one of the half-duplex modes allows for the transmission of the sequence CR—1st configured LTA character upon depression of the RETURN key on the keyboard. If code 66 is also selected, the LTA character will not be transmitted, but the Model 820 will revert to idle mode and wait for incoming received data or more keybaord entries, after the RETURN key has been actuated. If code 86 is selected in conjunction with code 67, and code 66 is not enabled, the sequence CR, LF, LTA will be transmitted. This parameter is inactive in full-duplex modes.

Answerback Memory Parameters
70
Entering parameter 70 followed by [RETURN] places the answerback memory (ABM) in program mode. The TSBS will display ␣ [_]!, indicating that the first character of the desired answerback message may be entered from the keyboard. The character count advances, up to a maximum of 21, as each character is entered. Messages of less than 21 characters may be terminated by actuating the [HERE IS] key. When the 21st character has been entered or the [HERE IS] key depressed, the TSB display advances to the next enabled configuration code.

The key stroke sequence [7] [0] [RETURN] [HERE IS] disables the ABM and erases any message previously programmed. The sequence [7] [0] [DEL] sets configuration error status. Code 70 is not displayed when the configuration is scanned by activating the [TAB] key, whether or not an ABM is programmed.

71
Parameter 71 enables automatic transmission of the answerback message when answering or originating a call.

72
Parameter 72 enables printing of the answerback message when the ABM is transmitted on line with local copy enabled or when the local configuration report is printed.

Optional ENTER Key Parameter
80
Entering parameter 80 followed by [RETURN] places the ENTER key into program mode if your Model 820 KSR is equipped with the optional numeric keypad. The TSD will display␣!␣¦ , indicating that the first character of the desired one-to-three character ENTER key message may be entered from the keyboard. The character count advances, up to a maximum of three, as each character is entered. Messages of less than three characters can be terminated by pressing the [HERE IS] key. When the third character has been entered or the [HERE IS] key depressed, the TSD advances to the next enabled configuration code.

Terminal Parameters
81
Setting of parameter 81 enables the terminal controller to recognize and act upon ESCape sequences received from the communications line interface.

82
Setting of parameter 82 causes local printout of transmitted data, regardless of the duplex communication mode configured.

83
If parameter 83 is enabled the terminal transmits a "busy" signal when the received data buffer is within 256 characters of overflow followed by a "ready" signal when fewer than 256 characters remain in the buffer. "Ready" and "busy" depend upon the transmission mode:

- Full duplex

  Busy—DC3 transmitted
  Ready—DC1 transmitted

- Half duplex

  No response possible

- Half duplex with reverse channel

  Reverse channel (circuit SCA) OFF at busy. If carrier is still being received and no line turnaround character has been received at ready, turn circuit SCA ON and continue operation.

  If Data Carrier Detect has switched OFF before ready, turn on Request to Send; at ready or when reverse channel (circuit SCF) turns on, whichever comes later, transmit the first programmed line turnaround character and turn off Request to Send.

- Half duplex with reverse channel, no LTA operation

  Turn SCA OFF at busy and ON at ready.

The status of configuration parameter 83 has no effect on the ready/busy signal provided on circuit SCF in the transmission modes selected by parameters 14, 15 and 16. Similarly, parameters 14, 15 and 16 have no effect upon the operation of parameter 83.

End of Line Function
Two on-off parameters provide a choice of implementations of "new line" operation. If both parameters are disabled, printer operation is conventional; that is, a CARRIAGE RETURN/LINE FEED sequence is required to initiate a new line.

Conventional operation (both new line parameters disabled) is the default condition.

84
New line on LINE FEED—printer responds to receipt of LF character by performing carriage return and line feed.

85
New line on CARRIAGE RETURN—printer responds to receipt of CR character by performing carriage return and line feed.

86
Setting of parameter 86 causes the control characters CR and LF to be generated with every

depression of [RETURN].

87
Setting of parameter 87 causes all control characters to be printed, using the character font of Figure 9-1, to enable analysis of incoming data streams. The control functions normally associated with these characters, including printer control functions, will not be performed.

88
Parameter 88 provides a means of locking the printer in compressed print mode to prevent inadvertent changes of horizontal pitch.

89
Parameter 89 sets the absolute right margin at column 80 to prevent inadvertent printing beyond the right edge of the form when the 820 is used in a network of 80 column format terminals.

91
Parameter 91 provides a means of locking the terminal in 8 LPI line spacing.

92
Parameter 92 enables the automatic perforation skip feature. When enabled, the top margin is set at line 3 and the bottom margin is set one line from the bottom of the form. This provides a 3 line perforation skip. Note that if this parameter is enabled, the minimum form length is 2.54 cm (1 inch).

93
Parameter 93 sets the absolute print line length to 8 inches; that is, 80 characters at 10 CPI and 132 characters at 16.5 CPI.

96
Parameter 96 causes DC3 to be transmitted when a paper out or carriage jam condition occurs; DC1 is transmitted when the fault is cleared and the RESET key pressed. Parameter 96 is functional in full-duplex communication modes only.

Appendix C

Model 820 KSR Specifications

Power Requirements

Voltage: 90-130 Vac, 47-63 Hz, single phase
180-260 Vac, 47-63 Hz, single phase

Power: 50 VA max., idle
75 VA average printing
150 VA max., executing form feed

Physical Dimensions

Size: 660.4 mm (26.0 in.) W × 533.4 mm (21.0 in.) D × 209.5 mm (8.25 in.) H

Weight: 18.64 Kg (41 pounds) excluding options

Acoustic Noise

Level: Less than 65 dB (A weighted) measured 0.9 meters (3.0 feet) directly in front under free field conditions while printing at 150 characters per second.

Environmental (Operating)

Temperature: 5 ° C to 40 ° C
Relative Humidity: 5% to 90% (no condensation)
Altitude: To 3046 m (10,000 feet)

Printer

Method: Wire matrix impact
Speed: 150-cps
Pattern: 9 × 7 dot matrix
Character Set: 95 ASCII plus 33 control character graphics plus parity error symbol
Characters Per Line: 132 maximum
Character Spacing: 10 per 25.4 mm (1 in.)
Character Spacing Tolerance: True position ± 0.01 mm (0.0004 in.), cumulative
Line Spacing: 6 or 8 per 25 mm (1 in.)
Line Spacing Tolerance: True position ± 0.25 mm (.010 in.), non-cumulative
Paper Drive: 2 Pinfeed tractors (4 pin)
Paper Feed: Rear and bottom
Paper Width: 76.2 mm (3.0 in.) to 377.9 mm (14.875 in.)
Paper Type: Continuous feed, fanfold, or multi part (original + 5 copies)
Ribbon: 54.8 m (60 yards) or 36.58 m (40 yards), auto reversing
Line Feed Time: 33 milliseconds
Paper Slew Rate: 190.5 mm (7.5 in.) per second
Adjustments: Forms width and thickness
Form Length: Programmable up to 355.6 mm max. (14 in.)
Detection: Paper out, carriage jam

Controls and Indicators

- Operator Control Panel:

  LINE/STANDBY/LOCAL switch
  RESET, FORMS Alignment pushbuttons
  FORM ADV, LINE ADV pushbuttons
  Terminal and Communications Line Status Indicators

- Other Controls:

  Typewriter keyboard
  Power ON/OFF switch
  CONFIGURE/OPERATE switch

Communications

Interface: EIA RS-232-C
Type Transmission: Asynchronous
Code: USASCII
Speeds: 110, 200, 300, 600, 1200, 2400, 4800, 9600
Modes: Full duplex, half duplex, half duplex w/reverse channel
Parity: Transmit odd, even, mark, space
Check odd, even, none
Receive Buffer: 1280 characters
Line Control: Auto answer, auto disconnect, printer ready/busy
Identification: 21-character answerback memory

Option Features

Printer: Compressed print (16.5 characters-per-inch, 218 char/line max.)
Control: Device/Forms Control
Interface: DC current loop
Configuration:
User specifiable default parameter sets (Up to 8)
User specifiable protected parameter sets (Up to 8)
Protected answerback memory.

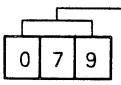
Appendix D

Operator Reference Cards

MODEL 820 KSR
OPERATOR REFERENCE CARDS

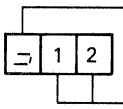
INTERPRETING 3-DIGIT DISPLAY FUNCTIONS

I. PRINT COLUMN/CURRENT LINE INDICATOR



Next Column to be printed
(001-218)
or
Current Line number
(01-99, 100-112)
(Note: Line or Column display selected by DFC command)

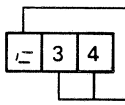
II. STATUS (DISPLAY FLASHING)



Indicates an error or special mode

See status codes

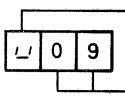
III. CONFIGURATION MODE



Indicates configuration mode

See configuration codes

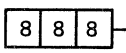
IV. PROGRAM ANSWERBACK MEMORY (ABM), LINE TURNAROUND (LTA) CHARACTER(S); OR ENTER KEY



Indicates in configuration mode and programming ABM, LTA, or ENTER

Indicates the next character position to be programmed
(21 max for ABM; 3 max for LTA or ENTER)

V. INDICATOR TEST



Indicates test is in progress

KEYBOARD CROSS REFERENCE
(UNLABELED CHARACTER GENERATION)

UNLABELED CHARACTER	GENERATED BY CONTROL + CHAR KEY	UNLABELED CHARACTER	GENERATED BY CONTROL+ CHAR KEY	UNLABELED CHARACTER	GENERATED BY CONTROL+ CHAR KEY
ACK	F	EM	Y	NAK	U
BEL	G	ENQ	E	NUL	[
BS	H	EOT	D	RS	=
CAN	X	ESC	\	SI	O
CR	M	ETB	W	SO	N
DC1	Q	ETX	C	SOH	A
DC2	R	FF	L	STX	B
DC3	S	FS	^	SUB	Z
DC4	T			SYN	V
		GS	]	US	– (minus)
		HT	I		
DLE	P	LF	J	VT	K

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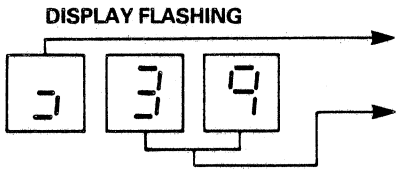
INTERPRETING A FLASHING DISPLAY

A long bell tone followed by a flashing display indicates a status code is present in the 3 digit display. These codes are prioritized in ascending numeric sequence (i.e., 00 highest priority; 39 lowest) and the highest priority code is displayed. The next highest priority code will be displayed after clearing the higher priority condition until all conditions are cleared.



STATUS CODES

TYPE	CODE	DEFINITION	ACTION REQUIRED
I		POWER UP FAULT	
	00	RAM memory fault	Equipment problem: cycle power.
	01	ROM memory I fault	If condition repeats, call for
	02	ROM memory II fault	service. Error indication may
	03	Nonvolatile memory fault	be cleared by depressing reset*
II		OPERATOR CORRECTABLE	
	10	Leaving Configure mode with half duplex set, but no LTA specified	Program LTA character, enable operation without LTA, or enable full duplex
	11	Carriage Jam	Clear Jam and depress RESET
	12	Paper Out	Load paper and depress RESET
III		ABNORMAL COMMUNICATIONS	
	20	Clear-to-send time out	Depress RESET**
	21	Loss-of-carrier time out	Depress RESET**
	22	Wrong number time out	Depress RESET**
	23	Receive buffer overflow	Depress RESET***
	24	Parity Error	Depress RESET or change parity***
	25	Transmit Buffer overflow	Depress RESET***
	26	No activity time out	Depress RESET**
IV		SPECIAL OPERATING MODE	
	30	Keyboard lock	Depress RESET or local mode
	31	Printer off	Depress RESET or local mode
	39	Test in progress	Depress RESET to terminate test
V		OPERATOR ERROR	
	⊐⊐	Invalid ESC sequence from keyboard due to improper syntax or configuration conflict	Depress RESET and type valid command sequence

*Clearing of error indication *may* allow terminal operation.
**Automatically reset when Data Set Ready turns on. (Repetition could indicate Data set failure.)
***Automatically reset when status report transmitted.

INTERPRETING INDICATORS

STANDARD INDICATORS

COMMUNICATION MODE	CARR RCV Indicator		LINE RDY Indicator		
	ON	OFF	FLASHING	ON	OFF
Half Duplex	Ready to Receive	Receive not ready; transmit available	In standby or transmit requested but not ready	Comm line ready	Comm line not connected
Full Duplex		Receive not ready; no carrier	In standby or transmit not ready		

OPTIONAL INDICATORS

INDICATOR	OPTION	CONDITION	EXPLANATION
ALTN. Char	APL	ON OFF	APL character set selected ASCII character set selected
Alpha Mode	Katakana	ON OFF	ALPHA mode selected KANA mode selected

INTERPRETING THE AUDIBLE SIGNAL

SIGNAL		EXPLANATION
Short Tone (1/12 sec)	1	ASCII BEL character has been received
	or 2	A configuration command or locally entered ESC command has been accepted.
	or 3	Power-up test has been completed successfully
Repeated Short Tones		Invalid attempt to initiate or terminate CONFIGURE mode operation (check LINE/●/LCL).
Long Tone (1 sec)		A new status code has been activated or an invalid configuration parameter or ESC sequence entered.

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FORMAT COMMANDS

ENTERING COMMANDS

Place LINE/●/LCL Switch in LCL or ● (standby) position.
Enter commands from keyboard.
All command sequences originated by depression of [ESC] key.
Successful execution of command signaled by short (1/12 second) bell.
Invalid command, due to syntax or configuration conflict, signaled by flashing symbols (⊐ ⊐ ⊐) in display and long (1 second) bell.

VERIFYING THE FORMAT

Printed report initiated by:

Place LINE/●/LCL switch in LCL or ● (standby) position
Depress [CTRL] [SHIFT] [5] keys simultaneously

Report printed in the following format:

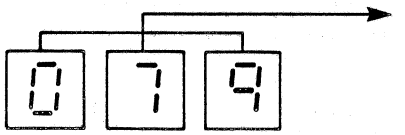
AAA; BBB; CCC; DDD; EEE; F; GG where

AAA = form length in lines (001-112)
BBB = left margin column number (001-218)
CCC = right margin column number (001-218)
DDD = top margin line number (001-112)
EEE = bottom margin line number (001-112)
F = number of lines per inch (3 = dbl space 6LPI, 4 = dbl space 8LPI, 6, 8)
GG = number of characters per inch (05 = EXP 10CPI, 08 = EXP 16.5CPI, 10, 16 = 16.5)

Tab stops are verified by depressing:

[TAB], for horizontal tab stops, or [CTRL] [K] for vertical tab stops
Read line or column number from 3 digit display
Repeat for each tab stop set.

LINE OR COLUMN DISPLAY FORMAT



Next Column to be printed (001-218) or Current Line number (01-99, 100-112)
(Note: Line or Column display selected by DFC command)

TABLE OF LOCAL COMMANDS

BASIC COMMANDS — (Available On All Terminals)

FUNCTION TYPE	KEY SEQUENCE [ESC] followed by:	DEFINITION OF COMMAND
FORM SIZE	[5] [N] [;]	FORM LENGTH = N (N = Number of lines; first line of form = present; clear top and bottom margins.
	[5] [;]	FIRST LINE OF FORM = present.
	[5] [0] [;]	LAST LINE OF FORM = present clear top and bottom margins.

TABLE OF COMMANDS

ADDITIONAL COMMANDS (Available with DFC Option)

FUNCTION TYPE	KEY SEQUENCE [ESC] followed by:	DEFINITION OF COMMAND
DISPLAY CONTROL	LF	DISPLAY CURRENT LINE NUMBER
	SP	DISPLAY NEXT PRINT COLUMN NUMBER
FORMS MARGINS	6	SET LEFT MARGIN at present position
	DEL 6	SET DEFAULT LEFT MARGIN
	7	SET RIGHT MARGIN at present position
	DEL 7	SET DEFAULT RIGHT MARGIN
	8	SET TOP MARGIN at present position
	DEL 8	SET DEFAULT TOP MARGIN
	9	SET BOTTOM MARGIN at present position
	DEL 9	SET DEFAULT BOTTOM MARGIN
	0	SET ALL MARGINS AT DEFAULT VALUES
HORIZONTAL & VERTICAL TABULATION	1	SET HORIZONTAL TAB STOP at present column
	2	CLEAR HORIZONTAL TAB STOP at present column
	3	SET VERTICAL TAB STOP at present line
	4	CLEAR VERTICAL TAB STOP at present line
HORIZONTAL PITCH	.	SELECT **EXPANDED** 10 CHARACTER PER INCH (effective 5CPI)
	,	SELECT **EXPANDED** 16.5 CHARACTER PER INCH (effective 8.25CPI)
	>	SELECT 10 CHARACTER PER INCH printing
	<	SELECT 16.5 CHARACTER PER INCH printing
VERTICAL PITCH	=	SELECT **DOUBLE SPACING** 6 LINES PER INCH (effective 3LPI)
	+	SELECT **DOUBLE SPACING** 8 LINES PER INCH (effective 4 LPI)
	-	SELECT 6 LINES PER INCH spacing
	_	SELECT 8 LINES PER INCH spacing
FORM MEMORY	/ *N*	STORE FORMAT PARAMETERS In nonvolatile storage location *N* (*N* = 1 or 2)
	\ *N*	RECALL FORMAT PARAMETERS from storage location *N* (*N* = 1, 2); top of form = present
	\ 0	LOAD DEFAULT FORMAT: top of form = present

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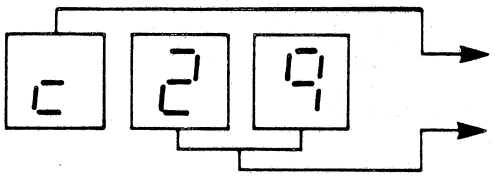
CONFIGURATION CODE SELECTION

DIRECTIONS: Place LINE/•/LCL switch to LCL position
Place CONF/OPER switch to Configure position

The terminal will enter Configure mode and display information in format shown:



This symbol indicates the terminal is displaying a configuration code.

Identifies the specific configuration code.

To **ACCEPT** displayed code and advance to next parameter, momentarily depress [TAB]

To **CHANGE** parameter (01-39), enter digits and momentarily depress [RETURN]

To **ENABLE** parameters (60-93), enter digits and momentarily depress [RETURN]

To **DISABLE** parameters (61-66; 71-93), enter digits and momentarily depress [DEL]

To **PROGRAM** parameters (60, 70, or 80), see Note (2)

To **TERMINATE CONFIGURE MODE**, place CONF/OPER switch to Operate position.

Configuration Code Selection

Code	Meaning
	Predefined Configuration Selection (One Only)
01-08	Select corresponding predefined configuration set (option required)
09	Select standard default configuration set
	Communication Mode Selection (One Only)
11(1)	Half duplex
12(1)	Half duplex with reverse channel
13(2)	Full duplex (For type 103, 113, and 212 data sets)
14	Full-duplex reverse channel ON for ready (console mode)
15	Full-duplex reverse channel OFF for ready (console mode)
16	DC Current Loop (option required)
	Transmission Rate Selection (One Only)
21	110 baud
22	200 baud
23	300 baud
24	600 baud
25	1200 baud
26	2400 baud
27	4800 baud
28	9600 baud
29(2)	300/1200 baud (For 212 data sets with autoselect option)
	Parity Selection (One Only)
31	Transmit odd parity, receive parity checkoff
32(2)	Transmit even parity, receive parity checkoff
33	Transmit odd parity, indication on receive error
34	Transmit even parity, indication on receive error
35	Transmit odd parity, indication plus printed symbol on receive error
36	Transmit even parity, indication plus printed symbol on receive error
37	Transmit mark parity, receive parity checkoff
38	Transmit space parity, receive parity checkoff

Notes:

1. Half-duplex operation: Configuration codes 11 and 12 should be selected only when operating with true half-duplex data sets such as the Bell 202 series.
2. Designates standard default parameter set.

Configuration Code Selection

Code	Meaning
	Line Control Parameters (No Limit)
60(3)	Program line turnaround characters for half duplex
61(4)	Enable fail-safe disconnect
62(4)	Disconnect on receipt of EOT
63(4)	Disconnect on receipt of DLE EOT
64(5)	Enable paper out or carriage jam disconnect
65(4)	Enable no activity disconnect
66	Enable half-duplex operations without line turnaround character
	Transmission Control Parameters (No Limit)
70(3)	Program answerback memory (ABM)
71(4)	Auto-trigger ABM on connection
72	Enable printing of ABM contents (Local configuration report or code 82)
	Terminal Control Parameters (No Limit)
80(3)	Program ENTER on numeric pad (option required)
81	Enable recognition of device and format control ESC sequence commands from the communication line (DFC option required)
82	Enable local copy of transmitted data
83	Transmit DC3 or BREAK on printer busy, DC1 on ready
84	Do NEW LINE on receipt of LF character
85	Do NEW LINE on receipt of CR character
86	Transmit CR LF when "RETURN" is activated
87	Print all controls characters
88	Set compressed print only (compressed print option required)
89	Set absolute right margin at column 80
91	Set 8 line/2.54 cm (inch) only
92	Enable auto perforation skip over
93	Set absolute printed line length of 8 inches
96(6)	Transmit DC3 on paper out or carriage jam, DC1 when fault is cleared and RESET pressed (full duplex only)
⎽⎽ ⎽⎽	Invalid configuration code has been entered

Notes:

3. *Programming the line turnaround (LTA) character(s), answerback memory (ABM), and ENTER key (on optional numeric pad):* The LTA, ABM, and ENTER programming sequences are initiated by typing "60", "70", or "80" followed by RETURN. Any sequence of the 128 ASCII characters may now be typed. The programming sequence is terminated automatically upon entry of the last character (3 max for LTA and ENTER, 21 max for ABM); if fewer than the maximum number of characters are used, the programming sequence may be terminated by pressing HERE IS. The sequence "60" (or "70" or "80"), RETURN, HERE IS erases the corresponding parameters.
4. Valid only when parameter 11, 12 or 13 is enabled.
5. Valid only with parameter 11, 12 or 13 enabled if ROM set 03B/04B, 05B/06B or 07B/08B is installed. Valid for all communication modes if higher numbered ROM set is installed.
6. This feature is not available with ROM set 03B/04B, 05B/06B or 07B/08B installed.

Index

USER'S RESPONSE SHEET

Manual Title: Model 820 KSR Terminal Operator and System Manual

TI Part No. 2208225-9701, Rev. J

Manual Date: October 1988 **Date of This Letter:** _____

User's Name: _____ **Telephone:** _____

Company: _____ **Office/Department:** _____

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Please list any discrepancy found in this manual by page, paragraph, figure, or table number in the following space. If there are any other suggestions that you wish to make, feel free to include them. Thank you.

Location in Manual	Comment / Suggestion
_____	_____
	_____
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